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VETERINARY MEDICINE

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features in this issue...

Report of the 57th Annual Meeting, United States Livestock Sanitary Association (Abstracts and notes of papers and committee reports)

TEPP Poisoning of Cattle

Effect of Ultraviolet Radiation of Hog Cholera Virus

Blood Concentration of Sulfisoxazole

Physiological Consideration in Rumen Digestion

Clinical Experience with Blood, Plasma, and Electrolytes Solutions

Designs for Small Animal Hospitals

(Complete Index on Page VIII)

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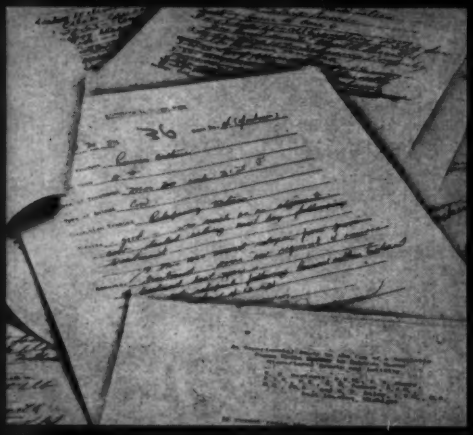

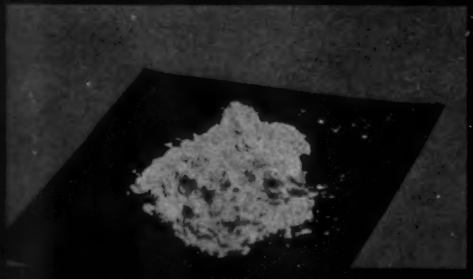

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Report Of The Fifty-Seventh Annual Meeting, U. S. Livestock Sanitary Association, Atlantic City, New Jersey

THOSE in attendance at this year's meeting of the U. S. Livestock Sanitary Association proclaimed it to be one of the most valuable of a long series of annual meetings. Paid registrations amounted to 233, approximately 25% of the total membership of this association. About 50 new members were added to the roster.

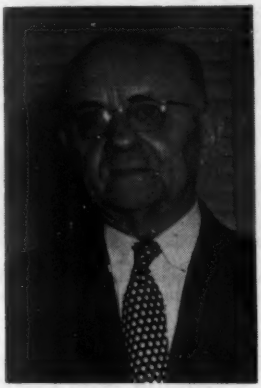
Changes in limitations on membership in the Executive Committee were contained in recommendations of the Committee on Revision of the Constitution which presented an amendment providing for the election of eight delegates-at-large to the governing body. Memberships in the U.S.L.S.A., as now spelled out, are designated as official and individual. The livestock sanitary departments of each state, the United States, and the Canadian, Cuban, and Mexican governments, Puerto Rico, the Virgin Islands, and Los Angeles County, California are eligible to official membership and representation on the Executive Committee. Any person engaged in livestock sanitary work or interested in such matters may be elected to individual membership.

Beside representation of official organizations as listed on the Executive Committee, eight delegates-at-large will be selected by the Nominating Committee. These shall be selected from each of the four districts, northeast, western, central, and southern regions of the United States. Additional nomination may be made from the convention floor but no more than two may be elected from each district. They shall be elected as other officers of the Association, excepting the secretary-treasurer who is appointed by the Executive Committee. It is anticipated that these alterations will resolve differences that have developed in recent years between livestock groups and the Association.

The President's Address

In his presidential address at the opening session of this meeting, Dr. T. Childs. veterinary directory general of the Department of Agriculture, Ottawa, Canada, spoke of disease control procedures in the Dominion and specifically how an outbreak of rabies in the northwestern provinces and one of hog cholera in southwestern Ontario were handled.

Of the latter, Doctor Childs stated that investigation indicated the disease had been present in an atypical or mild form for approximately two weeks before it was brought to the attention of Department veterinarians. The first premises known to be infected were placed under close quarantine and affected swine and contacts destroyed and buried the same day. Since these animals had passed through community auction sales only two or three weeks previously, it appeared reasonable that infection might be widespread. Radical control measures were put into operation immediately which included quarantine of all sales barns in the province, and the institution of cleaning and disinfection procedures. Movement of swine through these establishments was prohibited and those on hand were moved under special permit for slaughter. The entire southwestern part of Ontario, consisting of 29 counties, was placed under quarantine with respect to movement of all swine.



Dr. T. C. Green, state veterinarian, Charleston, West Virginia, was named President of the U.S.L.S.A. for 1953-54.

None was permitted from the quarantine area. Farm-to-farm inspections were made by an adequate staff of veterinarians who supervised destruction of diseased animals and their contacts wherever found. An educational program kept farmers informed of action taken. All swine within a radius of one mile from any infected premises were treated with hog cholera antiserum.

These procedures placed the outbreak under complete control almost at once and resulted in complete eradication in just 32 days from the date the disease was reported. In

Dr. R. A. Hendershott, State Veterinarian, New Jersey, Trenton, is the executive secretary of the U.S.L.S.A.

all, 54 premises were involved. Animals infected or suspected of being infected totaled 2,949 which were destroyed, compensation awarded owners amounted to $72,047.50.

Evidence of an effective mobilization plan for disease control within the Canadian Department of Agriculture is noted in the statement that 100 veterinarians, including local practitioners, were on the job in the quarantine area within a day or so after diagnosis was confirmed. In most cases, the same day on which infected, or suspected of being infected, swine were discovered, they were destroyed and buried.

Doctor Childs pointed out that this experience illustrates that when prompt and comprehensive action is taken under centralized authority, hog cholera can be eradicated. He believes this had been demonstrated repeatedly and conclusively in areas of Canada adjacent to those in the United States where hog cholera is periodically widespread.

Resolutions

In addition to several resolutions thanking those who appeared on the program for their efforts, the hotel and its employees for good service, the secretary-treasurer for local arrangements and the entertainment of visiting ladies, the Seabrook Farms and the Atlantic City Racing Association for generous entertainment, and Mrs. Charlotte Smith for accurate recording of proceedings, the Committee on Resolutions proposed the following:

1. That the Appropriations Committee of the Congress of the United States consider making increased funds available for enlarging disease control activities of the Department of Agriculture.

2. That the Association prevail upon the United States Justice Department to bring to trial those charged with smuggling Charolaise cattle in Louisiana from Mexico.

3. That the BAI be urged to investigate fully by controlled experimentation the possibility of using anaplasmosis vaccine as developed in South Africa for the control of this disease of cattle in the United States.

4. That a special report of the incidence and location of sheep scabies be distributed to all state officials every three months.

5. That the Association go on record condemning the sale and distribution of *Brucella abortus* stained antigen or any similar biological product for the purpose of conducting serological or milk ring tests for the detection of brucellosis in cattle or swine, except to official Bureau and state agencies. In the latter regard, the Committee expressed the belief that unrestricted distribution of a stained antigen makes possible disposing of unidentified reactors and suspect cattle by unscrupulous herd owners which might tend to destroy confidence in the official Brucella testing program.

6. That the Council on Education of the A.V.M.A., the presidents of land grant colleges, and deans of Veterinary Schools be requested to establish and maintain courses in disease control and eradication, sanitation, and cooperative practices with state and federal disease control officials.

New Officers

Following the precedent of years past the Nominating Committee advanced the three vice-presidents to serve for the ensuing year and placed a new name in nomination for the third vice-president. Elected by unanimous ballot were:

Dr. T. C. Green, Charleston, West Virginia, president

Dr. I. G. Howe, Albany, New York, first vice-president

Dr. H. F. Wilkins, Helena, Montana, second vice-president

Dr. A. L. Brueckner, Baltimore, Maryland, third vice-president

The Executive Committee reemployed Dr. R. A. Hendershott, Trenton, N. J. as secretary-treasurer.

The meeting next year (1954) will be held in Omaha, Nebraska on November 10-12, 1954. Headquarters: Hotel Fontenella. Only once before has Omaha been selected as host city by the Association. That date was in 1898, at the time of the Trans-Mississippi Exposition in that city. That was the second annual meeting of the then young organization. Its president was the late Mr. C. P. Johnson, Springfield, Ill.

The 1953 Annual Report

The notes, abstracts, and excerpts on the following pages of this issue of VETERINARY MEDICINE represent the opinions expressed by some of the speakers, as interpreted by this reporter, with his comments. It is not a complete abridgement but covers briefly only a few of the important discussions of this three-day meeting. Manuscripts submitted for publication in the Proceedings Book will appear in full with reference lists and discussions as recorded by the secretary. This year, as in past years, latest findings of research, advanced thinking on current animal disease problems, and much new statistical information of value and interest was presented.

Veterinarians are urged to take advantage of the opportunity for individual membership in the U. S. L. S. A., if for no other purpose than to receive annually a copy of the Proceeding Book. Dues are $3. annually, which include the printed work referred to above. Judged by standards of past years, this paper-bound volume will contain a wealth of new information that should be read by every practitioner. Cooperation with disease control officials is essential to the best efforts of both.

This year's report will be mailed earlier than in former years and every effort will be made to distribute it as promptly after each meeting as possible. For further information readers are encouraged to write Dr. R. A. Hendershott, secretary-treasurer, 1 West State St., Trenton, New Jersey.

▼ ▼ ▼

Milk from cows treated with antibiotics should be withheld from the market for at least three days after treatment.

BLUETONGUE IN SHEEP

Abstract of paper by Arthur G. Boyd, D.V.M. and James E. Stuart, DVM., Sacramento, California.

Bluetongue, also referred to in South Africa as catarrhal fever or epizootic catarrh of sheep, and earlier as fever, is endemic in Africa and has probably existed since the beginning of the sheep breeding industry in that country.

At the turn of the century and immediately thereafter, detailed studies were conducted on the malady by a number of investigators. From these, it was determined that bluetongue was caused by a filter-passing virus infection transmitted by biting insects. For many years it had been observed to occur seasonally and was most prevalent and severe in low lying pastures. A method of immunization was developed in 1906 by passing virus through sheep. This was referred to as "attenuated" virus vaccine. Some 50,000,000 doses of this product were issued by government laboratories during the period 1907 to 1943. Actually, the virus has been shown to be exceedingly resistant and the so-called attenuation by passage through susceptible animals was suggested by Neitz to be merely an adaptation of the virus to a particular set of conditions which reached a constant level after a short series of subinoculations.

The history of bluetongue in the United States probably predates by many years its identification in California in 1952. Earlier, Hardy and Price (*Jour. Am. Vet. Med. Assn.*, 120:23 [Jan.] 1952) described an affliction they named "soremuzzle" and indicated its striking resemblance to bluetongue.

Symptoms as Observed in California

The authors relate that the most constant and outstanding symptoms observed are marked depression and rapid emaciation. Edema of the muzzle, cheeks, ears, tongue, throat, and brisket is common in advanced stages. Hyperemia of buccal mucosa which may later become cyanotic is also common. Eroded areas, appear on the dental pad, tongue and gums. Encrustation appears on the margin or at the commissures of the lips confusing diagnosis. Loss of appetite, diarrhea, and stiffness to extreme lameness are common symptoms. In lame sheep, a reddish line may be detected at the coronary band. The variability of symptoms and lesions was emphasized by the speaker. Mild cases may go unrecognized and less severe ones present vexing problems of differential diagnosis.

Ten, and possibly 11, antigenically variable

strains of virus have been isolated in Africa, whereas only one has so far been identified in this country. The speaker urged that every effort be made to ascertain the facts in regard to existing strains to assist in preparation of protective vaccines to be released for field trials.

Transmission

Natural transmission is by insect vectors. Workers have failed to demonstrate contact transmission. Mosquitoes and gnats, principally the latter, have been proved as carriers, if only mechanical, and emulsion of gnats have induced the disease in susceptible animals. The gnat has been studied as a possible reservoir host but latest information appears to substantiate existence of a vertebrae host which may be either sheep or cattle. Further support of insect transmission is the observation that the disease is endemic at the period of greatest insect activity. It has also decreased in severity after frost. Occurrence in California has always been observed on or near irrigated areas where insect life abounds during late summer and fall.

Diagnosis

Bluetongue must be differentiated from foot-and-mouth disease, photosensitization, contagious ecthyma, stiff lamb disease, and founder.

Although lesions of foot-and-mouth disease and bluetongue appear on the same body parts, bluetongue is not characteristically a vesicular disease. Neurotic lesions of advanced cases are dissimilar, according to Henning, from the frayed, irregular borders of ruptured vesicles of foot-and-mouth disease. A characteristic symptom in lame sheep is the pink to reddish line at the coronet which may extend into the horny wall. This may not be apparent in black-legged breeds.

Positive differentation may be made by inoculation of oxalated blood into susceptible sheep. Such inoculum should be collected only from those animals in the early febrile stages.

Control Measures

Work on a suitable vaccine is being pushed and results of field trials are expected to indicate the value of this preventive measure. Control of insects may offer an effective preventive measure. Application of the usual quarantine measures, considering the insect vector problem or other carriers and unknown reservoir, is questioned. The disease is quite apparently well established in the western and southwestern states and vaccination, at present, appears to be the only satisfactory control method.

RINDERPEST

Notes from paper by James A. Baker, D.V.M., Ph.D., Veterinary Virus Research Institute, New York State Veterinary College, Cornell University, Ithaca, N. Y.

Rinderpest, so far as is known, does not now occur in the Western Hemisphere. Possibility does exist that it may be introduced into the United States from India or Asiatic countries where it now exists as an epizootic.

The disease may attack practically all cloven-hoofed animals. It is an acute infection of virus origin characterized by rapid course and inflammatory and necrotic changes of the mucous membranes.

Early symptoms of disease are depression, anorexia, and a staring coat. Later, ocular and nasal discharges appear resulting from ulcerative changes of membranes lining the nose and mouth. Ulceration is accompanied by a disagreeable fetid odor. Diarrhea is profuse in advance cases, with progressive emaciation and dehydration.

Autopsy lesion are primarily those involving mucous membranes of the entire alimentary tract, especially of the mouth, where ulcers are noted to contain cheesy deposits. Pneumonia, cystitis, and vaginitis may be observed as complications.

Most outbreaks occur in cattle, although the disease occurs among sheep and goats. Animals indigenous to areas where infection occurs appear to be more resistant than those from regions where no infection exists. American cattle are extremely susceptible. Infection usually is direct. Indirect contagion is considered to take a subordinate place in spread of infection. Uncertainty exists in regard to what extent carriers are involved in outbreaks of the disease.

Diagnosis must be confirmed by seriological test. Rinderpest may be suspected on clinical appearance and autopsy findings. Since neither characteristic symptoms of pathognomonic lesions are present, differential diagnosis is essential. Virus diarrhea of calves, occuring in the midwest, is one disease characterized by symptoms suggestive of rinderpest, except that mortality rate is lower.

Prevention of introduction is the best method of control. In the event of an outbreak early diagnosis will minimize losses. Certainly strict quarantine should be applied promptly and procedures advocated for control of foot-and-mouth disease, including slaughter of

herds in which infection is confirmed, should be initiated immediately. It was pointed out that animals may discharge virus in large quantities even before fever or other indications of any disease appears. Therefore, it is important that control or eradication procedures apply on a herd basis. Disinfection with those agents recommended and found suitable for foot-and-mouth disease were recommended for premise disinfection.

PROGRESS REPORT ON ERADICATION OF VESICULAR EXANTHEMA

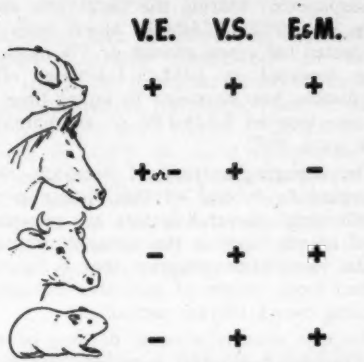
Notes from paper presented by Francis J. Mulhern, D.V.M., in charge Vesicular Exanthema Eradication Program, BAI, Washington, D. C.

Vesicular exanthema is a threat to the livestock industry of the United States. It is a continuing possibility that the disease might again sweep across the country as it did in 1952.

Formerly referred to as California garbage-hog disease, this supposedly insignificant infection has produced interruption of trade in live hogs and pork and brought fear of foot-and-mouth disease because of the similarity of symptoms and lesions.

Progress has been made in control by restricting movement of garbage-fed swine in interstate commerce and by passage of laws requiring the cooking of garbage. These things in themselves are not assurances that infection will not break out again. Procedures for cooking garbage are not perfected and foci of infection exist in widely scattered regions. A beginning has been made that gives promise. With adequate inspection of feeding establishments (twice monthly recommended) and cooperation of feeders and others concerned, eradication is possible. All states have now passed laws or regulations requiring garbage treatment before it is fed swine except Arkansas, California, New Mexico, North Dakota, Vermont, New Jersey, and Rhode Island. In some of these, action is being taken by state control officials that is hoped will bring the desired restrictions.

The most disturbing factor in the control picture is infection in eastern states claimed to have resulted from shipments originating in the hog belt where infection can not be found. The infection appears upon arrival at destination, although these animals have been shipped in properly cleaned and disinfected cars and inspection at source failed to reveal evidence of disease. It is assumed that infected garbage-fed swine, subsequently slaughtered locally, contaminated yards through



Differential diagnosis of vesicular disease of livestock is based on test inoculations in the four species illustrated above. Swine only are susceptible to all three virus diseases: vesicular exanthema (V.E.); vesicular stomatitis (V.S.); and foot-and-mouth disease (F. & M.).

which clean grain-fed hogs passed on the way to eastern feeding points.

Chief weakness in the present eradication program is complacency of some officials and feeders and in the fact that only about 31% of 14,000 premises feeding garbage are cooking it, and only 37% of such establishments are being inspected thoroughly and frequently. Considering that the program of eradication has existed for only a few months, results may be considered to be excellent. There is bright hope of complete eradication if progress made during the past year can be extended to cover the nation completely and intensified insofar as inspection procedures are concerned.

REPORT ON THE COOPERATIVE BRUCELLOSIS CONTROL AND ERADICATION PROGRAM

Abstract of paper presented by C. K. Mingle, D.V.M., M.Sc., Assistant in Charge, Brucellosis and Tuberculosis Eradication Division, BAI, Washington, D. C.

There were 369,000 more official blood tests made, and 508,000 more calves vaccinated, with Brucella strain 19 vaccine in 1953, than reported for the previous year. This is the 13th consecutive year increases have been reported. These figures indicate the growing interest and demand for brucellosis eradication. It is providing impetus to the project that is certain to make rapid progress as cooperative efforts are applied.

A review of the past year's work reveals that 670,532 herds, representing approximately 12,000,000 cattle, have been screened by the milk-ring test. Of these 26.2% were classified

as suspicious. During the fiscal year ending June 30, 1953, 7,750,000 blood tests were conducted for a new record, or 5% more than were reported in 1952. Likewise, official vaccination has increased to an all-time high for one year of 3,628,149, or an increase of 16% over 1952.

The changing attitude of livestock owners in regard to control of this disease is most encouraging. Several factors are responsible. Chief among them is the apparent soundness of the vaccination program that is becoming evident from results of extensive experiments reaching over a 10-year period.

There is essentially equal division of states now making indemnity payments on reactors to the blood agglutination test for brucellosis. During the past year two more states discontinued indemnities. Many livestock owners of infected herds are cooperating fully with leaders in promoting work of eradication under provisions of plans that serve partially to cushion serious economic shock.

PRESENT STATUS OF PULLORUM DISEASE ERADICATION

Abstract of paper presented by H. Van Roekel, D.V.M., Ph.D., Dept. of Veterinary Science, Massachusetts Agricultural Experiment Station. Amherst.

Pullorum disease control in the United States is a model of what can be done in reducing the incidence of disease in animals. Armed with knowledge of causative agent, infection cycle, and an adequate diagnostic test, eradication of any disease is possible. Experience with pullorum disease is an example. Active control programs in some eastern states have been in operation for over 25 years. Effectiveness of efforts may be judged by the record in Massachusetts. In 1921, Massachusetts tested 24,718 birds and culled 12.5% of them as reactors; in 1953, 1,168,739 birds were blood tested in this state with a pullorum incidence rate of 0.04%. An outstanding record of accomplishment.

Today 47 states are participating in the National Poultry Improvement Plan which was inaugurated in 1935. This plan recognized two pullorum classes that tolerated infection; one (Pullorum-Tested) was deleted in 1948. However, 24 states still recognize the Pullorum-Controlled class, and in this are located many flocks that qualify only in this lowest class. Now plans have been initiated to revise standards of the plan with no tolerance of infection. There would exist only one class based on the facts, as determined by the blood tests, of whether a flock was free, or not free, of reactors. This step is a logical one to assure that only known pullorum-free flocks supply hatching eggs to prevent perpetuation of the disease.

STUDIES ON BOVINE BRUCELLOSIS IMMUNIZATION

Notes from a paper presented by H. S. Bryan, D.V.M., M. E. Mansfield, B.S., D.V.M., and Robert Graham, B.S., D.V.M., Dept. of Veterinary Pathology and Hygiene, College of Veterinary Medicine, University of Illinois.

A series of experiments on 228 heifers which were between four and eight months of age were reported. From these tests it was concluded that Huddleson's mucoid vaccine failed to provide a significant degree of resistance against brucellosis, whereas BAI strain 19 vaccine did induce a significant resistance of a relative type. Two other experimentally produced vaccines were tested and reported to be of no value in providing protection against Brucella challenge.

ANTIBIOTIC THERAPY IN ANAPLASMOSIS

Abstract of paper by James G. Miller, D.V.M., M.S., formerly Agricultural Experiment Station, Baton Rouge, La., presently Department of Pharmacology, University of Michigan Medical School, Ann Arbor.

Any treatment proposed for the relief of symptoms of disease should have specific action against the causative agent. In the case of anaplasmosis a satisfactory therapeutic agent also must effectively combat anemia always associated with the pathological processes.

In 1952, a number of practitioners throughout Louisiana cooperated with personnel of the state experiment station in a field study to determine the efficacy of antibiotics in the treatment of anaplasmosis in cattle. Observations were recorded in 132 clinical cases treated with aureomycin®[1] and terramycin®[2]. Approximately equal numbers were treated with one or the other of these two broad-spectrum antibiotics. The degree of advancement of disease in the field cases varied, but 82% had less than 30% of a normal hemaglobin level when treatment was initiated. Most of these cattle had been ill for two or more days and affected animals were suffering from acute anemia, resulting from the attack. To be effective in such cases, treatment must necessarily be directed to relieve anemia immediately. Antibiotics have no antianemic properties and it was concluded that only a

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®[1]Lederle Laboratories Division, Pearl River, N. Y.

®[2]Chas. Pfizer & Company, Brooklyn, N. Y.

few of the animals treated in the field studies should have been given antibiotics.

The role of aureomycin and terramycin in the treatment of anaplasmosis is a limited one. It is a useful tool when cases are properly selected. Doctor Miller believes that their use is indicated at the first sign of abnormality and prior to development of classical symptoms. Even this early use must be supported with blood transfusion to combat anemia until a more satisfactory adjuvant is available. Good nursing care and limitation of all possible movement were stressed. The action of each of these broad-spectrum antibiotics is to inhibit active multiplication of *Anaplasma marginale*. In this use it is not truly prophylactic. Treatment before at least 1% of the red cells are infected, only delays symptoms. Early diagnosis depends on expectation of a herd outbreak in which case antibiotics may be employed on a herd-wide basis.

ERADICATION OF BOVINE TUBERCULOSIS

Abstract of a report by Asa Winter, D.V.M., Assistant Veterinarian in Charge of the Brucellosis and Tuberculosis Eradication Division, Bureau of Animal Industry, Washington, D. C.

Reported rate of tuberculosis in cattle is unchanged from that reported for last year. This is nevertheless the best record yet presented since more than 500,000 more animals were tested during the past 12 months than in the preceding annual period.

Doctor Winter referred to the complacency that has prevailed in regard to this disease since accreditation of the nation. He also emphasized that tuberccculosis has the ability to reestablish itself in susceptible cattle. It is becoming increasingly difficult to reduce present rate of incidence. Rate of infection must be based on results revealed in those animals tested. These represent in figures given only 10% of the total cattle population.

Tuberculous lesion cases discovered by the Federal Meat Inspection Service have been fewer in number since the last annual report. There were 1,406 carcasses retained because of tuberculosis, as compared with 3,133 in 1952, which means that there was but one retention for every 10,814 inspections made in 1953. This, in itself, may be a world's record. With continuous effort to improve the animal identification system so that the meat inspection reporting service may designate foci of infection to field forces, eradication of remaining sources of trouble may be revealed with a minimum of intradermal testing. The cervical test was recommended.

Avian-Swine Tuberculosis

Continuing lack of interest on the part of producers ragarding tuberculosis in swine droves and laying flocks may partially explain the failure to reduce the reaction rate in cattle to the tuberculin test. Nearly 2,500,000 swine carcasses or 4.3% of those slaughtered in plants maintaining federal inspection were retained as lesion cases this year. No condemnation figures are available for poultry. These losses could be largely avoided by well-defined management practices and good stockmanship.

VIBRIOSIS OF CATTLE IN RELATION TO IMPAIRED FERTILITY

Notes from paper presented by A. H. Frank, D.V.M., and J. H. Bryner, A.B., Bettsville, Maryland.

Infections such as trichomoniasis, vibriosis, and brucellosis are characterized by a repeat-breeding syndrome. Trichomoniasis (*Trichomonas foetus*) and vibriosis (*Vibrio foetus*) are venereal diseases. Both causative organisms are motile and capable of invading uterine tissue after being deposited, with semen, into the vagina. *Brucella abortus* is nonmotile and incapable of reaching susceptible uterine tissue except by mechanical means. Abortion may result from intrauterine insemination of semen containing *Brucella abortus*. Semen from the same bull, contaminated with *B. abortus*, does not produce abortion if deposited intravaginal. Explanation of this phenomenon observed in experimental work is partially explained on the basis of motility of the causative agent of abortion. All these infections are capable of living and multiplying in the uterus for indefinite periods.

Vibriosis is self-limiting in most females, but many remain infected. The causative organism is susceptible to penicillin and streptomycin in dilutions recommended for antibiotic treated semen. It has not been isolated from cows bred artificially with treated semen from known infected bulls.

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Workers at the Georgia Coastal Plain Experimental Station report that prior to June 1950, the number of cattle autopsied and found to be suffering from parasitic disease was practically negligible. During 1950-51, 6% of all cattle autopsied were found to be suffering from clinical parasitism, and during the past two years this percentage has increased to 11 and 17, respectively.

Committee Reports

BRUCELLOSIS

Report by R. L. West, D.V.M., Chief, State Livestock Sanitary Board, St. Paul, Minn., chairman.

Statistical information made public by the Bureau of Animal Industry indicates that the number of blood agglutination tests for brucellosis increased 5% in 1953 over the figure given for 1952. Vaccinations also increased 16% and use of the milk ring test (ABR) 47% as compared to the previous fiscal year. Percentage of blood reaction was given as 3.4%—a slight decrease. The Commitee's report pointed out that these figures do not necessarily reflect the national incidence of disease. No testing is reported from some states, while in others testing is confined to certified herd testing only. Furthermore, two states, Wisconsin and Minnesota, which report well over 25% of the total blood testing done, conduct such tests largely in herds positive to the ring test. This means that reported incidence may be higher than that which would result from testing a sufficient number of representative herds over the entire country.

In its recommendations, the Committee urged (1) the reestablishment of the three-year rule for Brucellosis Free Areas, (2) that the BAI produce all the Brucella antigens employed in official testing laboratories, (3) that shipments of vaccine be reported to the state livestock sanitary official of the state of destination, (4) that there be published recommendations on diagnostic levels as determined by the blood test, and (5) that liquid vaccine be discontinued, and no licenses for their manufacture be given after January 1, 1956.

In reference to interstate regulations the following recommendation was proposed:

None but the following classes of cattle may move interstate: (1) Animals originating from certified brucellosis-free herds, (2) feeder cattle, (3) steers, spayed heifers, and calves under six months of age, (4) cattle consigned for immediate slaughter, (5) official vaccinated animals, without test, up to 30 months of age, (6) calfhood vaccinated animals over 30 but under 36 months of age, providing the blood test made within 30 days of shipment does not react in dilution of incomplete at 1:100, and (7) all others if negative to blood test conducted within 30 days of movement interstate.

VESICULAR DISEASES

Report by M. S. Shahan, D.V.M., Plum Island Animal Disease Laboratory, Greenport, Long Island, chairman.

The Committee, formerly designated as the Committee on Foot-and-Mouth Disease, has been appropriately designated as above because of the inseparable nature of viral vesicular diseases of livestock.

Canada has remained free of foot-and-mouth disease since declared free by its Minister of Agriculture on August 19, 1952. This may be considered a tribute to the aggressive and thorough manner of eradication procedures in the Dominion. Unfortunately, the disease broke out again in Mexico on May 23, 1953.

The ravages of foot-and-mouth disease in Central and Western Europe were reviewed in the Committee report. What proved to be the most severe outbreak of the century appeared in 1949 and again in 1951. Since, incidence of the disease has substantially decreased and at present is at low ebb. Complications of seriologically variant types made prevention and control extremely difficult. Invasion from Germany of type A5 virus attacked animals in several countries, where the problem was already complicated by types A, O, and C. Type A virus vaccine failed to confer satisfactory protection against A5 infection. The efficacy of trivalent vaccine, employed in Europe and South America, has been questioned by some workers and is being intensively studied in leading European laboratories.

Statistical information given attests the seriousness of outbreaks in Europe. Finland, free of foot-and-mouth disease from 1941 to 1952, reported several thousand animals affected with type A5 virus. Here the disease was reportedly brought under control in January of this year. During the last half of 1952, over 3,000,000 cases were reported in France involving 429,000 premises. England suffered 116 outbreaks in 1951, 495 in 1952, and 27 through August 6, 1953. Similar severe epizootics occurred in other countries of central and western Europe. None escaped its ravages.

New developments and findings of research were included in this report. Foot-and-mouth disease has been propagated in unweaned white

mice. This interesting finding holds the possibility of furthering intensive study of the nature and character of the viruses involved more economically than formerly.

Doctor Shahan referred to unexpected delays in development of final plans for the Plum Island Animal Disease Laboratory, Chiefly because of high costs of island construction. He stated that construction is expected to be under way at least by early spring of next year and that all facilities will be completed in late 1955.

Vesicular exanthema. Note vesicules (circled) near the posterior cleft margin. Lesions on the coronary band are covered with a blackened crust. Vesiculation, rupture, and scab formation progress in rapid succession.

INFECTIOUS DISEASES

Report by S. H. McNutt, D.V.M., Professor, Department of Veterinary Science, University of Wisconsin, Madison, chairman.

Mastitis. Procedures recommended for effective control and eradication of mastitis in dairy cows are not now being used. Likewise, most organized control programs have failed to accomplish objectives.

Mastitis was reported to be a major detrimental factor in milk production. Carefully compiled records of losses incident to this disease in one county in Wisconsin serves as the basis of an estimated $125,000,000. annual loss in Wisconsin alone. It may reasonably be expected that a similar situation exists over the entire United States, in which case, previous estimates of national losses due to mastitis have not reflected the staggering truths. If the dairy industry is to survive the pressure of competition now applied by substitutes and increased costs, it must reduce this disease tax.

The Committee reported that, "There is now sufficient evidence to cause one to theorize that the present promiscuous, widespread use and misuse of drug treatments for mastitis is causing a shift to other types of infectious agents that previously were rare but are more damaging than the common types of the immediate past". Instead of the mastitis problem being eliminated with new agents made available, the disease continues to extract equal or greater tolls.

Shipping Fever. The writers of this report stated that more knowledge of all aspects of this disease must be developed before sound and effective control measures can be applied. It has been stated, and is rather generally believed, that the etiological agent is a virus, though this fact has not been established. Efficacy of preventive and treatment methods rests largely on clinical evidence.

Leptospirosis. Leptospirosis is a major livestock disease problem. Based on scant evidence available it appears reasonable that approximately 4% of the cattle of this country are newly infected each year. Economic losses are considered to be tremendous, not in mortality losses alone but to those due to decreased production, abortion, and unthriftiness.

Bovine leptospirosis, according to the writers, has been diagnosed clinically and confirmed seriologically in 40 states covering every geographical region in the United States. The disease may be characterized clinically by a wide variety of symptoms which include elevated temperature, anorexia, depression, diarrhea, anemia, icterus, abortion, and weight loss. Serological procedures are valuable laboratory tools for confirmation of diagnosis. Antibodies appear during the second week following infection.

This report also considered some factors of Johne's disease and mucosal disease of cattle, the latter recently described by staff members of the Iowa State College, Ames.

ANAPLASMOSIS

Notes from report by W. T. Oglesby, D.V.M., Department of Veterinary Science, Louisiana State University, Baton Rouge, Louisiana, chairman.

The insidious nature of anaplasmosis in cattle makes accurate estimates of animal losses directly resulting from infection difficult. Estimates of losses range from $6,000,000. to

$10,000,000. annually. Using the best treatment and management practices available to them, practicing veterinarians have not been able to cope with the disease. It is not an uncommon observation in field work for sick animals exhibiting no evidence of illness to drop prostrate after mild exercise.

The Committee's report this year points out that new facts in regard to the disease have been established. Most significant is the work on the complement-fixation text for the detection

Typical attitude in anaplasmosis. Accumulating evidence indicates increased incidence of this disease.

of carrier animals. The Committee emphasized that portion of the 1951 report in which it was stated that, "The key to the problem of the control and eventual complete elimination of anaplasmosis from our herds still is the carrier animal. The detection of all carrier animals still is awaiting a simple, reliable test, easily applicable. It must, either alone or in conjunction with some other test or tests, also easily applicable, detect every carrier in the herd, for to leave only a single one invites disaster in the future".

If the problem of diagnosing carrier animals can be resolved through perfection of the compliment-fixation test a major advance will be made in disease control. These tests, carried out during the season when clinical cases are at a minimum may make possible positive identification of carrier animals which can be removed from the herd or possibly treated as was reported by Splitter and Miller (*Vet. Med.*, 48:486, [Dec.], 1953).

Hopeful results of the use of antibiotics as therapeutic agents has been tempered by findings regarding the necessity of accurate timing of administration of these agents. If given too soon (before 1 to 2% of the r.b.c. are affected) development of the disease may be only retarded, if given after symptoms are apparent such treatment above cannot be expected to relieve the condition of severe anemia. Whole blood transfusion is considered the best single supportive measure in all stages of acute disease.

EXOTIC DISEASE

Report by Frank A. Todd, D.V.M., Special Consultant, Federal Civil Defense Administration, Washington, D. C.

Animal disease is the important limiting factor in profitable production of livestock. Failure to develop and maintain adequate disease control measures, in consideration of changing world situations, is to expose the industry to needless and serious losses. One need not look further for an example of the fact that disease travels as man and his animals travel, than the experience with Texas fever, the control problems of which incited organization of the group to which this report was addressed.

Photo courtesy USDA-BAI

Foot-and-mouth disease lesion, interdigital space.

Today's rapid intercontinental air transport provides a new hazard to susceptible livestock. It is conceivable that one or more of a number of foreign diseases, not now existent in the United States, might be accidentally introduced. This is not to say such might be introduced through design.

The Committee has prepared an extensive list of exotic diseases to which our livestock are susceptible. One may react to the suggestion that we need to know more about them

by assuming the attitude that present problems are all consuming. The reporter urged his listeners to consider these diseases, some of which are merely strange names, and realize that no barrier, however effective, can be expected absolutely to prevent introduction of all agents that might spread rapidly with disastrous results. The outbreak of foot-and-mouth disease in Canada a year ago is a classic example of what might be repeated. In this case, disease occurred in a most unexpected location—not at a border point—but in an isolated locality of a central Canadian province.

Photo Authenticated News
Bovine trypanosomiasis

Successful disease control depends upon: (1) Prompt detection and reporting; (2) accurate diagnosis; (3) knowledge of epizootiology; (4) elimination of cause or causes from the host or its environment; (5) isolation and quarantine; (6) development of a prophylactic agent and making it available; and (7) development of effective methods of treatment. The key to prevention of non-existent Old World diseases among the susceptible stock in this country is the knowledge about them and consciousness that they may appear at any or many widespread points anytime.

BIOLOGICALS AND PHARMACEUTICALS

Report by N. H. Casselberry, D.V.M., Berkeley, California, chairman.

The availability of modified live virus hog cholera vaccines during the past year appears to have been fortunate as their uses permitted immunization of large numbers of swine with available hyperimmunune serum. Serious shortages of hog cholera antiserum supplies at the beginning of the vaccination season resulted from outbreaks of vesicular exanthema late in 1952. In view of experiences since late summer 1951, the Committee recommended that virulent hog cholera simultaneous virus be stricken from the list of products licensed for interstate shipment. It is the opinion of the Committee members that the value of modified live hog cholera virus vaccines and hog cholera antiserum injected simultaneously has been demonstrated to confer satisfactory immunity and the exclusive use of these agents will eliminate the dangers inherent in the use of virulent virus.

The large variety of vaccines offered for prophylaxis against Newcastle disease in poultry was cited as being confusing, with the result that variable results attend their use in many cases.

It was recommended that consideration be given to restricting production of these vaccines by manufacturers not holding federal licenses by requiring all producers to conform to a single set of standards.

The Committee warned against the haphazard use of antibiotics in the treatment of animal diseases, particularly mastitis, because of possible development of strains of infecting microorganisms which may become resistent to these valuable therapeutic agents. It is believed by this reporter that considerable evidence exists that the warning is, at this time, actually a fact. After some years of widespread lay use of potent antibiotics for the treatment of mastitis, there has been no reduction in the incidence of this disease and indeed it is considered by some observers that infecting strains of bacteria are not only more resistant but larger numbers of cases are shown to have resulted from rare infecting agents. Others are difficult to control. In sum, promiscuous use of antibiotics has complicated and confused the control of this number-one disease enemy of dairy cows.

Attention was also given in this report to a group of diseases considered as chronic. Losses from these conditions cannot be assessed by mortality figures. Their insidious nature makes their control of major importance since morbidity losses are usually underestimated. Attention of researchers was urged for development of improved methods of therapeutic procedures designed to curb inroads caused by a variety of infecting agents. Among these were anaplasmosis, infectious rhinitis, vibriosis, trichomoniasis, several parasitic infections, baby pig enteritis, swine dysentery, necrotic enteritis of swine, pink eye, and foot rot.

PUBLIC HEALTH

Notes of report presented by W. L. Bendix, D.V.M., Richmond, Virginia, chairman.

Functions of this Committee are essentially those formerly assigned the Committee on Meat and Milk Hygiene. The newly named Committee on Public Health will concern itself with animal diseases transmissible to man.

Public health workers charged with the responsibility of assuring a safe and healthful milk supply in the areas of their jurisdiction are giving increasing consideration to bovine brucellosis. Laws and ordinances have been enacted in many political divisions from cities to states. In general these require, or will require in the near future, that all fluid milk offered for sale be from blood-tested and clean herds. The Committee recommended that the Association endorse the United States Public Health Service standard milk ordinance which includes provisions for assuring a milk supply only from brucellosis-free herds.

New federal regulations restricting the movement of hogs fed uncooked garbage were praised by the Committee, as was action taken by the legislatures of virtually all states requiring that garbage fed to hogs be cooked. No action has been taken in those states where infection is most concentrated which includes Rhode Island, California, and New Jersey. Concern of the Committee in restrictions on garbage feeding is the problem of trichinosis. It was stated that enforcement of the cooking provisions of recent laws could be expected to reduce the incidence of Trichina in pork and trichinosis in man.

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MORBIDITY AND MORTALITY

Notes of report presented by C. E. Wichtor, D.V.M., Los Angeles, California, chairman.

For 33 years the U.S.L.S.A. has endeavored to publicize the need for a national reporting system for morbidity and mortality statistics of domestic animals. Like the weather, everyone talks about it but nothing is ever done about it.

A year ago, this Committee made definite recommendation that there be set up at the national level and in an existing office of the BAI, an official whose duties would be concerned with the preparation and distribution of incidence of reportable diseases in all states. A basic list of diseases was prepared (see VETERINARY MEDICINE, 48:21 [Jan.], 1953), forms were readied for printing, and other details arranged so that a beginning could be made by January 1, 1953. To date, no concrete evidence is apparent that the BAI will be in a position anytime soon to inaugurate such a service. Accordingly, the Committee has simplified forms which state officials would submit to the executive secretary of the Association, who would assume the responsibility for consolidation and distribution of such material to state agencies.

This arrangement fails to fill all the qualifications of an ideal reporting system but, with the cooperation of state regulatory officers, it is hoped a start can be made in 1954. If nothing else is accomplished the proposal will offer a means by which information in different state offices can be interchanged.

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TRANSMISSIBLE DISEASES OF POULTRY

Notes from report by H. Van Roekel, D.V.M., Ph.D., Dept. of Veterinary Science, Massachusetts Agricultural Experiment Station, Amherst, chairman.

Respiratory anomalies constitute a major poultry disease problem. Newcastle disease, infectious bronchitis, and chronic respiratory disease (CRD) are prevalent in both the United States and Canada.

Poultry flocks can be protected against Newcastle disease, if the present available live virus vaccines are applied properly. Live virus vaccine which produces an active outbreak of infectious bronchitis, is considered to be the only effective means of conferring immunity to this disease in young birds. The Committee report cautioned that these vaccines should not be used in states or areas where disease is not a problem.

Researchers are in rather general agreement that chickens and turkeys may harbor ornithosis (psittacosis) infection and remain asymptomatic. Little is known regarding either the clinical picture or the pathology of the disease in domestic fowl. One definite isolation in turkeys indicated that the disease might be confused with a form of infectious sinusitis.

Included in the Committee report was statistical information released by the BAI. Percentage of reactors to the pulloram test was 0.23% as determined from testing 35,654,526 birds in 86,300 flocks of chickens. Percentage incidence in turkeys was 0.18. These figures reflect a lower rate than reported for 1952. Gratifying progress is being made in eliminating infection which has resulted from concerted effort based on sound and effective control measures.

PARASITIC DISEASES

Notes from report by Benjamin Schwartz, A.B., A.M., Ph.D., Chief, Zoological Division, Bureau of Animal Industry, USDA, Washington, D. C., chairman.

Internal and external parasites of livestock are directly responsible for losses largely preventable by known means. The greatest losses, as would be expected, result from the unspectacular, insidious undermining of the health of food anima'.s. Annual dollar loss to the livestock industry is not known but is estimated to be substantial.

Fundamental bases for effective parasite control have been taught for many years. Educators have pointed out repeatedly that

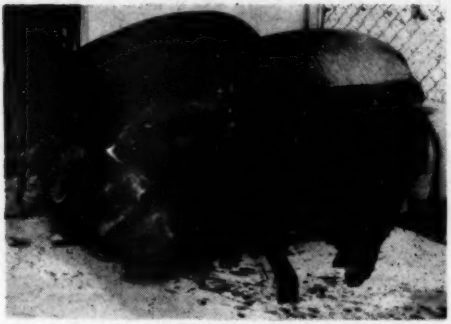

Photo courtesy Lloyd A. Spindler, Sc.D.

Effect of intestinal threadworms on growth of pigs. Four months after artificial infection the weight of the pig in the foreground was 135 lb. less than the average of the two uninfected litter mates in the background.

good management practices must be integrated with adequate consideration of the biological aspects of important species of injurious parasites. Perhaps the difficulty arises because of the complicated variety of these forms of life that attack animals. Few stockmen are sufficiently acquainted with life cycles, modes of transmission, and other points that suggest control measures, to take intelligent action in many instances. A notable exception is the McLean County system for the control of swine parasites. This simple detailed procedure, devised several decades ago, is to this day standard for swine parasite control. No other control procedure has been given such wide publicity.

Numerous protozoan and helminthic parasites occur commonly in cattle, sheep, and hogs. Diagnosis, in many cases, may be difficult and losses as a result of parasitism improperly evaluated. Methods of treatment fall short of ideal even though biological aspects are thoroughly understood. Tissues attacked are frequently vital, or position of adults are such that they can not be reached by anthelmintic agents now available.

The Committee emphasized the importance to stockmen of a working knowledge of the fundamentals of the biology of parasites to enable them to maintain good parasite control at minimum costs. It pointed out that there are variations in methods of infection and transmission, and that effective control measures depend upon the basic principles of sanitation and medication, emphasizing prevention rather than cure.

ERADICATION OF HOG CHOLERA

Notes from report presented by L. M. Hutchings, D.V.M., M.S., Ph.D., Purdue University, Lafayette, Indiana, chairman.

This Committee again reaffirmed recommendations made in the comprehensive report presented at the Kansas City meeting in 1952. (See VETERINARY MEDICINE, 47:17 [Jan.], 1952). The Subcommittee on Public Relations referred to in the 1952 report has reached a final stage in the drafting of a phamph!et to be published by the Association entitled, What is Known about Hog Cholera, for general distribution. It will be on the order of the earlier popular phamphlet, What is Known about Brucellosis.

Further plans to initiate a test area and program for hog cholera eradication were made by appointment of a second Subcommittee charged with preparing methods of procedure, making financial arrangements, and selection of an area or areas necessary to activate pilot tests. This Subcommittee will report its recommendations by early spring.

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PRINCIPLES OF ANIMAL HEALTH

R. R. DYKSTRA, D.V.M.
Manhattan, Kansas

Urea in Dairy Rations

The question of adding urea to dairy cattle rations comes up rather frequently. As nearly as it is possible to give a reasonably up-to-date answer, as derived from reliable current sources, urea is not a protein, although rumen bacteria are able to convert it into amino acids and protein. Research has indicated that urea is of no value for milk production purposes if the grain ration already contains from 14 to 18% of protein, as it will be utilized only to the extent of 40% or less. On the other hand, if the grain ration has no more than 10% of protein, such as in homegrown grains, it can be utilized to as high as 80%. In the Middle West it may be economically sound, in general, because carbohydrate concentrates are usually lower in price than protein concentrates, to feed one pound of urea and six pounds of carbohydrate concentrate, provided that the price of this combination is less than that of seven pounds of protein concentrate. English researchers have found that when more than three ounces of urea are fed per day, it exhibits its toxic action by a depressant effect on milk production, which means that if a cow receives six or seven pounds of grain per day the limit of urea should not be over 3%. With dry dairy cows and growing heifers during the winter season, urea can be used so as to utilize some of the poorer quality roughages in combination with cereal grain and molasses, but with good quality legume hay. Dairy heifers will make normal gains on such rations without a grain supplement.—*Abs. from USDA, Bureau of Dairy Industry Circular 160, September 1953.*

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Anthelmintic for Ox-Warble Control

Dosing of Warble-infested Cattle with Anthelmintics, is the title of a preliminary report in *The Veterinary Record,* Sept. 5, 1953. The preparation used by the author contained phenothiazine, hexachlorethane, and an organic tin compound. Cattle on two farms were treated. On the first farm, 139 animals were given the anthelmintic, and 74 left untreated to serve as controls. Those treated were dosed early in December 1952, and in January, February and the middle of March, 1953. On the second farm, 28 heifers were treated in mid-January and again in March. Twenty-three animals on this farm were left as untreated controls.

None of the treated animals on either farm were warble-infested when last examined late in July 1953. On the first farm, all untreated controls developed mature larvae. On the second farm, nine of the controls remained free though the remaining 14 harbored larvae. The belief expressed by another researcher is that anthelmintics probably exert their greatest effect during the period that the larvae are migrating through the tissues. In the project reported on by Worden, only *Hypoderma lineatum* has been identified. The author cautions that only tentative conclusions may be drawn from the project.

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Dwarfism in Cattle

Dwarfism has become a problem in some cattle herds. Quite naturally owners and breeders are much concerned, and they attempt to eliminate animals — especially males —that may carry the gene for this condition. Gregory of the University of California has developed the so-called "profilometer" by means of which the profile of bulls may be measured, since bulging of the frontal bones in young bulls is believed to be evidence of the existence of the dwarf gene, or whatever is the cause of the condition. Geneticists are not yet ready to be committed about the value of the "profilometer" as a diagnostic device because of insufficient supporting evidence. On the other hand, some breeders contend that, following its use, carriers of dwarfism have been weeded out before the taint has made appreciable headway. Research agencies are studying the problem from the standpoint of the geneticist, the influence of endocrines, blood types, etc.

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A research project at the Purdue Agricultural Experiment Station concerning the nutritive value of charcoal in the rations of swine has, as its main summary, the following: "The addition of charcoal to well balanced synthetic or natural rations at levels of 0.5 to 3% of the ration had no significant effect on growing-fattening pigs."

TEPP (Tetraethyl pyrophosphate) Poisoning Of Cattle

R. D. RADELEFF,* D.V.M., Kerrville, Texas

AN EXTREMELY toxic compound was synthesized prior to 1938 by Dr. Gerhard Schrader of the Farbenfabriken Bayer of Germany, to which he applied the name of pyrophosphoric acid tetratethyl ester, but which is known in this country as tetraethyl pyrophosphate, or abbreviated TEPP[1]. The toxicity applied equally to insects and all warm-blooded animals. Although highly potent as an insecticide, TEPP is rapidly decomposed when diluted with water so that in a matter of a few hours the compound is no longer toxic. This ephemeral action has limited its use to special applications in the past, none of which has been a direct hazard to livestock.

Recently combinations of TEPP with molasses, with or without lindane, have been suggested as fly baits of particular advantage when flies resistant to chlorinated hydrocarbon insecticides are to be dealt with in dairy barns.

Preliminary studies of the toxicity of such TEPP baits to livestock by Batte[2] represent the most recent knowledge of the toxicity of TEPP to livestock. Batte found a 0.25% spray of TEPP toxic and lethal to a three-day-old Jersey bull calf, the only one so treated. Sprays containing 0.06% TEPP were not toxic and represented the next highest concentrations used in his tests on baby calves.

Lehman[3] considered TEPP the most dangerous of all insecticides as an acute oral and dermal toxicant, an opinion apparently shared by Doctor Schrader, and estimated that the probable fatal oral dose of TEPP for a man would be 12 mg. (approximately 1/5 gr.).

The following case illustrates not only an extensive loss of cattle by spraying with TEPP, but also the ever-present danger of untrained people misunderstanding the intended use of a product when inadequate instructions and warnings, or no instructions or warnings, are placed on the container of a highly toxic compound.

On July 23, 1953, a rancher residing near San Marcos, Texas, purchased a one-gallon container of formulated insecticide containing, according to the label, 40% TEPP. The entire label and directions on the container, omitting only the name and address of the formulator, were as follows:

40% TEPP
1 gal.

Caution: Avoid spillage on skin or inhalation of mist. If external, wash thoroughly. If internal, call a physician and inject atropine intravenously.

No suggested uses or limitations of use, or directions for dilution were on the label, neither did the word "Poison" appear on it. The material had apparently been intended for use on pests of oats.

The rancher was not influenced in any way by sales personnel but made his own selection.

On the following day, the gallon of TEPP concentrate was diluted to 120 gallons with water in a power sprayer with thorough agitation, making a final concentration of 0.33% TEPP (assuming the concentrate to weigh 8.3

*U. S. Department of Agriculture, Agricultural Research Administration, BAI.

lb. and the percentage of TEPP to be on a weight/weight basis). This resultant spray was applied to 29 cattle of mixed ages including calves, cows and a bull, and to an undetermined number of hogs.

Approximately 25 minutes after spraying them, the rancher was aware that the cattle were dying and roughly 40 minutes after spraying, all of the 29 cattle were dead.

On the insistence of his wife, the rancher bathed and changed clothing within minutes after he became aware of the condition of the cattle. He was then placed under the care of a physician aware of the proper procedures to be taken. Fortunately symptoms did not appear in the rancher.

The symptoms displayed by the cattle and reported by those present at the time of the loss included dyspnea, excessive salivation, trembling, ataxia, paralysis, and death, occurring in that order, and the complete chain of symptoms occurring in from two to five minutes. Autopsies conducted on the following day were unsatisfactory due to decomposition but the findings, which were essentially negative, were compatible with TEPP poisoning.

A veterinarian was called but, in spite of his promptness in answering the summons, arrived only to see the last cattle die. When he learned of the treatment applied, he set about at once to wash the hogs that had been sprayed, none of which had displayed symptoms, and in all probability averted losses of those hogs.

It is highly unlikely that TEPP will ever be used directly on livestock as a recommended procedure, but its presence on farms in the form of concentrates intended for the preparation of fly baits or for treatment of crop-feeding insects will be a hazard of high potential to all warm-blooded creatures on the premises, including man. Veterinarians should therefore be alert to this source of poisoning and be ready to deal with it in animals and make sensible moves to protect people exposed to it.

Proper treatment of TEPP poisoning would include the administration of atropine to control the parasympathetic activity induced by the interference of TEPP with cholinesterase, oxygen inhalation to prevent and alleviate the attendant respiratory distress, blood transfusions to replenish the cholinesterase reserve, and concomitantly, removal of the poison by bathing or washing, gastric lavage, or other indicated procedure.

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Vandemark, Salisbury, and Boley of the Department of Dairy Science, and the College of Veterinary Medicine, University of Illinois, report in the *Journal of Dairy Science* the results of a project dealing with pregnancy interruption and breeding technics in the artificial insemination of cows. They used cows during the 64th to 152nd day of pregnancy.

The fertilizing medium used was semen mixed with sodium citrate-sulfanilamide-yolk diluter. When this material was deposited midcervically in seven cows, normal pregnancies continued, and on postmortem examination 18 to 24 days later there were intact foeti. Eight cows were given intrauterine deposits of the diluted semen. One of the eight aborted nine days later. Eighteen to 77 days later, the remaining seven cows of this group of eight were slaughtered and on autopsy there were found in the uterus, disintegrated foeti and fetal bones. Six other cows had the diluted semen with added penicillin and streptomycin placed intrauterine. Of these, two had interrupted pregnancies and in four normal pregnancies continued. The advice of the authors is in favor of midcervical deposit of the fertilizing medium in the artificial insemination of cows.

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In Australia, the European-Australian rabbit is a decided pest and attempts have been made by various means to control it. These rabbits are highly susceptible to a filtrable virus producing in them a fatal myxomatosis or mucous tissue tumors. The virus has no infectivity for other common animals. This organism has now been liberated in the field with a resulting heavy mortality among these unwanted rodents, estimated to be as high as 99.5% in some regions. Evidence seems to be that mosquitoes and other skin-puncturing arthropods, if they puncture into a myxoma, are capable of mechanically transmitting the virus to susceptible rabbits. At this time it is too early to determine whether or not the few remaining rabbits may develop a resistance to the virus, transmitted to their offspring, so that in the future, the results from the standpoint of rabbit control may not be so spectacular.

Studies Of The Hog Cholera Virus: I. The Effect Of Ultraviolet Irradiation†

WILSON B. BELL,* B.S., M.S., D.V.M., Ph.D.,
Blacksburg, Virginia

VARIOUS workers have studied the effect of ultraviolet irradiation on certain viruses and, in some instances, the viruses were inactivated without a loss of immunizing potency. A search of the pertinent literature available revealed no studies of this nature on the hog cholera virus. The purpose of this paper is to report such studies.

Literature

The exposure of certain viruses to ultraviolet irradiation rendered them both avirulent and nonantigenic. The herpes virus[14] and the yellow fever virus[5] were rendered avirulent and nonantigenic by exposure to such irradiation. The virulence of the foot-and-mouth disease virus[14] was destroyed after exposure for five minutes to a mercury vapor lamp. Various neurotropic viruses, exposed to a quartz mercury resonance lamp, in the form of brain suspensions, were inactivated in twenty minutes[9]. On the other hand, some viruses have been rendered avirulent without destruction of immunizing potency. The virulence of the rabies virus was destroyed, but good protection was obtained in mice that were injected with the virus irradiated at 12.5 centimeters by a quartz mercury vapor lamp for 45, 50, or 60 minutes[11]. Further investigation[12] indicated that the rabies virus, exposed under proper conditions to the rays of a mercury vapor lamp, lost its virulence yet retained considerable immunizing potency for mice. The preparation of a highly potent vaccine by the irradiation, in a thin-film continuous flow chamber, of brain suspensions containing the rabies virus has been described[7]. The practicability of the use of irradiated rabies virus in the prophylaxis of rabies in man and dogs has also been investigated[16,17,18,19]. Two strains of the influenza virus, PR8 and Melbourne, were inactivated by exposure to a quartz mercury vapor lamp for nine minutes[15]. The inactivated virus was still capable of immunizing mice. Other studies[10] showed that ultraviolet irradiation did not alter the immunizing potency of certain strains of the influenza virus. In these studies, fluids containing the virus were exposed at a distance of seven inches, in open petri dishes, to the irradiation of a General Electric germicidal lamp.

Viruses other than those affecting mammals have also been found to be inactivated by ultraviolet irradiation. Among such viruses studied are: the tobacco mosaic virus,[8] the Rous chicken sarcoma virus,[1] and the fowl pox virus[6].

The effectiveness of various lamps has received attention,[3] and it has been reported that most viruses inactivated by ultraviolet light showed a maximum sensitivity at 2650 Angstrom units. A method of exposing virus-containing materials in a continuously flowing film less than one millimeter thick has been described[13].

Materials and Methods

Virus. A commercial strain of virus was used for the stock virus. At no time was there reason to believe that the virus contained any variant strain. Two ml. of the stock virus were injected into a susceptible pig, which was sacrificed when the temperature reached its peak. The spleen was removed aseptically, and a portion of it was ground in a sterile mortar with the addition of sufficient sterile saline to make a final suspension of 10 gm. of splenic tissue in 100 ml. of saline. Large particles were removed by filtering the suspension through several layers of sterile gauze, and the filtrate was further clarified by centrifugation at 1,800 r.p.m. for five minutes. The supernatant fluid, designated as pig-spleen virus, was either used immediately or stored until used at 4 C. The irradiation was accomplished by pouring the pig-spleen virus into a sterile petri dish to a depth of 1 to 2 mm. and placing the open dish 15 cm. from the light source. Agitation of the dish during the exposure was done in an attempt to insure adequate irradiation.

The effect of the irradiation on the viru-

†Adapted from a thesis submitted to the Virginia Polytechnic Institute in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

*From the Department of Biology, Virginia Agricultural Experiment Station, Virginia Polytechnic Institute, Blacksburg.

lence of the pig-spleen virus (designated as irradiated pig-spleen virus) was made by the injection of 5 ml. of the irradiated pig-spleen virus into susceptible pigs. Control pigs received 5 ml. of the non-irradiated pig-spleen virus. Daily observations were made for the development of symptoms, and autopsies were performed whenever indicated. Pigs that survived the injection of the irradiated pig-spleen virus were challenged with 2 ml. of virulent virus three to four weeks after the injection of the irradiated pig-spleen virus.

Pigs. Weanling pigs were obtained from two herds in which there was no history of recent hog cholera and in which other infectious diseases were also absent. The pigs from one herd were farrowed by immune sows, whereas the other herd was not vaccinated. The pigs were kept in a stock pen for at least two weeks before use. At the time of use they were moved to an animal unit and placed either in pens or cages. Prevention of spread of infection in the animal unit was accomplished by measures adapted to the requirements of each group of pigs placed in the unit.

Ultraviolet lamps. Two lamps, manufactured by the Westinghouse Electric Corporation, were used. One, designated as CH4, was a 100-watt mercury vapor lamp. According to the specifications, it transmitted no radiations below 3050 Angstrom units and the use of a black light filter further limited the radiations transmitted to ultraviolet light of predominately 3650 Angstrom units. The second lamp, WL793, according to the specifications, transmitted approximately 95% of the ultraviolet light in the region of 2537 Angstrom units. These radiations were generated by an electrical discharge through low pressure inert gases and mercury vapor enclosed within the special glass tube of the lamp.

Results and Discussion

Ultraviolet irradiation of the hog cholera virus, in the form of a spleen suspension, under the conditions described did not destroy the virulence of the virus for the pig. The results are shown in table 1.

One pig injected with pig-spleen virus irradiated for 60 minutes by the CH4 lamp and one pig injected with pig-spleen virus irradiated for 60 minutes by the WL793 lamp remained free from symptoms. Both were found to be immune when challenged with virulent virus. It is entirely possible that they possessed an innate immunity. Two pigs, injected with pig-spleen virus irradiated by the WL793 lamp for 60 minutes developed symptoms from which they rapidly recovered. Both, as expected, were immune to the virulent virus. No evidence of partial attenuation of the virus was obtained, since incubation periods, severity of symptoms, and extent of lesions were, in general, similar to those observed in the control pigs.

Table 1. Summary of Effect of Irradiation on Virulence

No. of Pigs	Irradiation Lamp	Irradiation Minutes	Effects of Virus Symptoms	Effects of Virus Lesions	Challenged
3	CH4	30	3	3	0
3	CH4	60	2	2	1*
3	WL793	15	3	3	0
3	WL793	30	3	3	0
17	WL793	60	16	14	3*
8**	———	0	8	8	0

*Immune to challenge.
**Controls for nonirradiated virus.

It has been shown[18] that rabies virus in suspension not cleared by sedimentation and centrifugation was not destroyed by an exposure of 60 minutes to ultraviolet irradiation. Additional factors reported to influence the action of ultraviolet light include turbidity of solution, amount of shaking, kind of lamp, and presence of extraneous organic matter. The filtration and centrifugation of the suspensions used in this study removed visible particles. The small size of the hog cholera virus,[8] however, may have allowed masking of the virus by particles not removed by the procedure used. With the exception of agitation, the factors listed as influencing the action of ultraviolet irradiation could have influenced the effects of the irradiation on the pig-spleen virus, although the turbidity is not thought to have had a significant part. On the other hand, the hog cholera virus may possess considerable resistance to the effects of ultraviolet light.

Summary

The effect of ultraviolet irradiation on the virulence of the hog cholera virus has been described. Under the conditions of the studies, the virulence was not destroyed, or reduced.

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(*Continued on page 22*)

Blood Concentration Of Sulfisoxazole Following Administration Of A Standard Dose To Cattle†

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CLINICAL experience has indicated that the recommended dose of sulfisoxazole, 0.8 gr. per lb. of body weight daily, is not therapeutically effective in cattle[1]. This ineffectiveness may be explained, in part, by a relatively low blood concentration after administration of this dose rate.

Procedure

A total of nine cattle of mixed breeds were studied; the animals were mature, healthy, and had an average weight of 750 lb. Animals were divided into three equal groups and sulfisoxazole was administered to each animal at the rate of 0.8 gr. per lb. of body weight. The drug was administered orally to group I, intravenously to group II, and intraperitoneally to group III.

A blood sample was drawn from each animal before administration of the drug to serve as a blank and to determine if the animal had been previously treated with other sulfonamides. Subsequent blood samples were taken one hour after the drug was administered, and then every four hours for the succeeding 24 hours. All samples were analyzed for free and total sulfisoxazole by the method of Bratton and Marshall[2].

Results and Discussion

The average blood concentration of free sulfisoxazole for each group is shown in fig.

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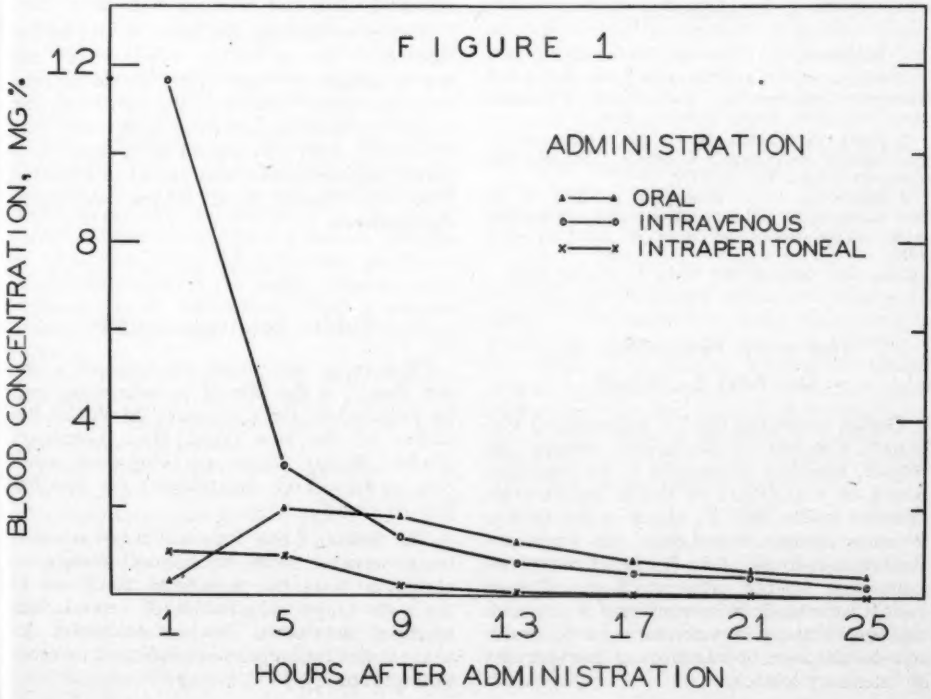
*Department of Veterinary Physiology and Pharmacology, University of Missouri, Columbia.



1. The analysis of 48 blood samples showed a mean difference of 0.10±0.23 mg. % between the concentrations of total and free sulfisoxazole.

Clinically effective levels of free sulfonamides range from 3-7 mg. % for sulfathiazole to as high as 15 mg. % for sulfanilamide and sulfadiazine[3]. Assuming that sulfisoxazole is effective at the lower range of this scale, effective blood levels were found only after the intravenous administration of the recommended dose and then for only a few hours. These findings are in general agreement with those of Florestano *et al.*[4] who report an apparent rapid excretion of sulfisoxazole and the necessity of frequent administration to maintain effective blood levels.

Summary

Sulfisoxazole administered to mature cattle at the rate of 0.8 gr. per lb. of body weight produced clinically effective blood levels only when given intravenously and then for a relatively short period of time; oral and intraperitoneal administration of this dose did not produce clinically effective blood concentrations. The difference between free and total sulfisoxazole was found to be relatively small.

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Honorary Fellowship to Dr. Karl F. Meyer

During sessions of the XV International Veterinary Congress at Stockholm, Sweden last August, honorary fellowships in the American Board of Veterinary Public Health were awarded to Dr. Karl F. Meyer of the George Williams Hooper Foundation, San Francisco, California, and Dr. Jean Verge of the Alfort Veterinary College, France. Both of these awards were made in recognition for outstanding contributions in veterinary public health and the elevation of standards of this specialty of veterinary science.

Pathologist's Headache

Pathologists have many causes for headaches, but the most frequent is caused by letters that do not contain sufficient information. A complete history is often more useful than the carcass that accompanies it, and yet, many letters contain no pertinent information.

A letter sent with a specimen should contain the following information:

1. A description of the animal; breed, sex, peculiarities, etc.
2. Incidence of the disease in the area.
3. Number of animals showing symptoms, and their ages.
4. Number of dead.
5. Dates of the first losses, and of subsequent losses.
6. The symptoms and their durations.
7. Ration fed.
8. The condition of the eyes, feet, integument.
9. A description of the spread of the infection, if in a flock or herd.
10. Treatment, if any.
11. Type of housing.
12. Accessory information, the type of preservative used, and a return address.

Frozen or diseased specimens should be forwarded by air or railway express; they can not be shipped by mail. They should be carefully and legibly labeled on the inside and out. Other specimens preserved in fluid media may be sent by mail; they should be in sturdy containers not more than three inches in diameter. The letter should, by all means, accompany the specimen.

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Public Relations Leaflet

"You mean, they have veterinarians in the Air Force", is the title of an interesting leaflet prepared by the Committee on Public Relations of the New York State Veterinary Medical Society. These are being made available to New York practitioners for distribution to clients.

The theme of this little leaflet, what veterinary services mean to human welfare, is aimed to make the uninitiated conscious of the wide range of activities of veterinarians by brief statements. Some considerable interest in this leaflet has been indicated by other state groups.

Some Physiological Considerations In Rumen Digestion

MARK L. MORRIS, D.V.M., Topeka, Kansas

THE number of bacteria and other microorganisms in the rumen of all ruminants is large, and their growth and metabolism is essential to nutrition of these animals. Rumen microorganisms break down starch, cellulose, pentosans, and simple carbohydrates including pentoses in the animal diet to form low-molecular-weight acids. They utilize nitrogen and sulphur from simple compounds in feed as well as from feed proteins along with carbon from breakdown products of carbohydrates to form their own body protein. If the number of these essential microorganisms present in the rumen is below normal, or their metabolism is subnormal, normal rations are not completely utilized. Rumen microorganisms present in health act upon roughage or cellulose. They also convert low quality protein and limited amounts of nonprotein nitrogen, such as urea, into useful protein. A normal compliment of microorganisms in the rumen means economical utilization of rations. If properly nourished, these also supply the vitamin B needs of cattle and sheep.

Many diseases can be ascribed to mismanagement, malnutrition, and often injudicious treatment. It is well understood that under a number of conditions normal rumination and digestion are seriously disturbed, *i.e.*, in injury, shock, disease, transportation, sudden changes in feed, weather, poor sanitation, and mismanagement. It is in these instances that veterinarians are called upon to do something promptly to salvage animals for livestock owners.

When sheep or cattle go off feed, chemical and physiological changes occur rapidly. It is a few of these important functions to which your attention is invited.

When normal digestion is disturbed, saliva flow is either decreased or ceases entirely. This is an important physiological phenomena because saliva contains alkaline salts which serve as buffers and assist in keeping the pH of the rumen content at a neutral or slightly acid level. Acid fermentation develops in the rumen of the sick animal, saliva ceases to flow, and rumen content shifts more and more to an acid reaction. This process creates an environment unsuitable for the growth, development, and reproduction of normal rumen microorganisms, consequently their numbers decrease rapidly. Rumination is either retarded or stopped entirely. When this occurs, known changes in the bacterial population result and according to Hungate *et al.*,[1] normal Gram-negative organisms disappear and in their place many Gram-positive cocci and bacilli, especially *Streptococcus bovis,* become evident. Under these conditions, the reaction of the rumen will drop to as low as pH 4 or 5 as the production of lactic acid increases. Desirable protozoa also disappear rapidly. Butyric and propionic acid make an appearance and complete rumen stasis develops. Hungate *et al.*[1] have shown that cellulolitic bacteria will not grow at a pH of 5.5 or less; consequently, cellulose and fiber in the rumen under conditions of such acidity undergo fermentation and degeneration. It is not difficult to produce these changes experimentally in the rumen of sheep. For example, the introduction of but 3 lb. of pure glucose dissolved in water into the rumen via a stomach fistula will cause the death of a normal sheep quickly. The same can be accomplished by the feeding of 3 or 4 lb. of cracked corn. These authors summarize observations in this regard as follows:

"An excess of grain or glucose, introduced into the rumen, causes a marked change in rumen microorganisms. Cellulolitic bacteria are greatly decreased in numbers. Protozoa are killed. The relative number of Gram-positive bacteria increases. Nonvolital acids accumulate and the amount of volital acids diminishes. Rumen motility is partially or completely inhibited. Death results in a high proportion of untreated animals.

"The high acidity of the rumen content, pH 4.1 to 4.7, is due to the fermentation of food by bacteria. Evidence has been obtained that *Streptococcus bovis* usually causes this acidity. It grows extremely rapidly and because it is a homofermentative organism, lactic acid accumulates when it becomes predominate in the rumen."

Kunkel[2] states, "First, feed the total nutritional requirements of the desirable bacteria. Second, feed factors which may control undesirable bacterial development."

This is a sound approach, but how are we going to know what constitutes a balanced desirable ration for the normal microflora of ruminants? And how are we to determine the acid-base balance of the rumen of the animal under supervision? What steps can be taken to compensate for the lack of salivary flow which helps to control acid-base balance? With these data at hand, we are in a better position to feed a ruminant patient which has undergone surgery for removal of a foreign body, or to give attention to a high producing cow that is off feed while on official test.

A manuscript by Westcott, Moore, Connor and Riley[3] discusses the development of a synthetic media powder designed to enhance rumen microflora growth and activity. This preliminary report may be exceedingly important and it is suggested that it be examined carefully.

When treating a bovine patient, caution should be exercised in regard to selecting a therapeutic agent. A large dose of mineral oil may be detrimental. Sulfonamides or antibiotics may be lethal to certain groups of pathogenic organisms, but may also be lethal to desirable bacteria which are fundamental to normal digestion.

Profloran,® a substrate medium employed by the Michigan clinicians has been formulated to accomplish several objectives. It contains: (1) Alkaline salts to serve as a buffer and to substitute in part for the lack of salivary flow, (2) a nutrient media in which normal Gram-negative organisms can develop and grow.

One of the serious drawbacks to transplanting fresh rumen contents has been that at the time transplants are made conditions exist which are unsuitable for the growth of the normal organisms, thus, too often, those transplanted wither and die rather than grow and flourish.

Practitioners should follow developments growing out of research employing an artificial rumen, the further investigations of the normal and pathogenic rumen flora, and the combined roles of the bacterial and chemical processes in maintaining ruminant digestive health.

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®Jensen-Salsbery Laboratories, Kansas City, Mo.

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Hog Cholera Virus

(*Continued from page 18*)

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Veterinary Cadet Training At The Army Medical Service Reserve Officers Training Camp

WM. E. JENNINGS, COLONEL, V.C., Fort Sam Houston, Texas

ONE hundred and fifty-four veterinary cadets attended the 1953 Army Medical Service Reserve Officer Training Corps Summer Camp at the Medical Field Service School, Brooke Army Medical Center, Fort Sam Houston, Texas.

The cadets received their instruction at the Medical Field Service School, the world's largest military medical school. On hand at the camp as instructors were six Veterinary Corps officers from college R.O.T.C. units. They were: Col. Charles E. Robinson, U.S.A.F., V.C., Ohio State University; Lt. Col. Edwin J. Sunderville, V.C., Cornell University; Lt. Col. Martin A. Ross, V.C., University of Pennsylvania; Maj. Gordon W. Vacura, V.C., Kansas State College; Maj. Bernard H. Skold, V.C., Colorado Agricultural and Mechanical College; and, Capt. Samuel Thompson, V.C., Iowa State College.

Among their studies in all phases of military veterinary medicine were food inspection, preventive medicine, public health, and veterinary laboratory service. They also visited abattoirs, canning plants, dairies and dairy processing

U. S. Army photo

Pfc. Charles L. Goff of Haversville, Ky., wearing a well-padded outfit, is attacked by a war dog. The demonstration on utilization and employment of Army dogs in the United States Army was viewed by cadets attending the 1953 Army Veterinary Corps Reserve Officer Training Corps Summer Camp at Brooke Army Medical Center, Fort Sam Houston, Texas.

U. S. Army photo

Mr. H. M. Brundrett demonstrates to a group of veterinary cadets, one of the sprayers used for application of insecticides at the Kerrville Agricultural Experimental Station.

plants, and the stockyards at San Antonio, Texas.

Among the many trips the cadets took was one to the United States Department of Agriculture Parasitology and Plant Quarantine Experimental Station at Kerrville, Texas. A great deal of work is done there in developing better insecticides, which, while effective, do not harm the animal or the resultant meat products. The cadets were able to observe a biopsy performed for the removal of the omentum from a steer to determine the amount of absorption of the insecticide.

The cadets also visited the Texas Agricultural Experiment Station at Gonzales, Texas, where they observed experiments being carried on in the field of poultry diseases. Also on their schedule was a trip to the Luling Foundation, Luling, Texas, where methods of livestock improvement and soil conservation are demonstrated for the benefit of farmers, especially those of small means and limited equipment. Other installations visited were Stahl Brothers Poultry Plant and the Veterinary Depot, both at Gonzales, Texas, and the School of Aviation Medicine at Randolph Air Force Base.

Closing out their six weeks of training was a three-day trip to the King Ranch at Kingsville, Texas, the world's largest cattle ranch. Here the cadets were given a chance to examine the Santa Gertrudis cattle for which the ranch is famous.

Among the guests who visited the encampment were Brig. Gen. Jacob L. Hartman, V.C., chief of the Veterinary Corps; Dr. C. D. Van Houweling, A.V.M.A.; Dr. R. D. Turk, Texas A. and M. College; and Dr. William A. Hagan, dean of the New York State Veterinary College, Cornell University.

At the graduation exercises on July 31, 1953, two of the cadets were sworn into the United States Air Force Reserve as Veterinary Corps officers. The cadets became eligible for their Second Lieutenant commissions by graduating from college and completing the summer camp.

Commanding the summer camp was Maj. Gen. Martin E. Griffin, M.C., Commanding General, Brooke Army Medical Center. The Deputy Camp Commander was Col. William E. Jennings, V.C., chief, Veterinary Branch, Department of Professional Sciences, Medical Field Service School.

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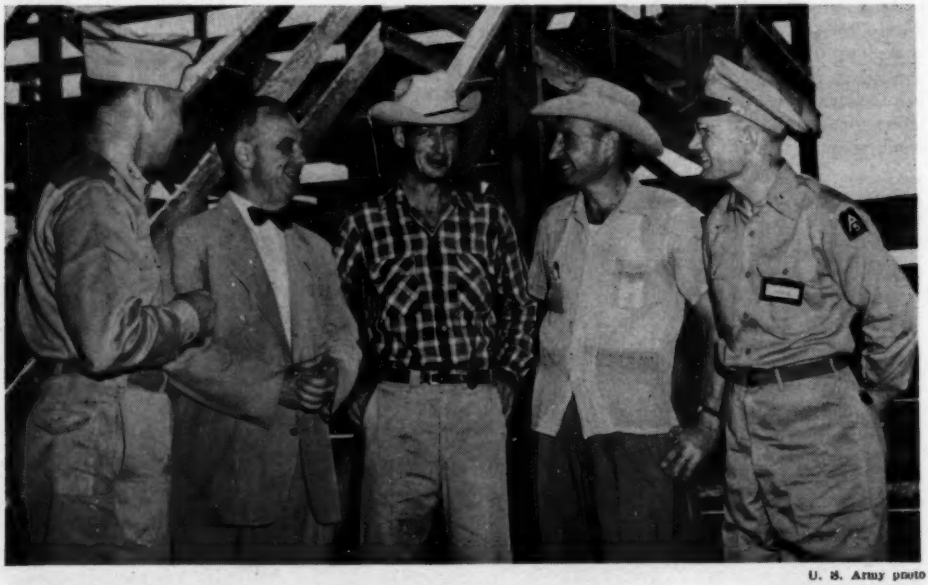
The graves of famed Irish Brigade casualties at the Gettysburg Battlefield are watched over by a statue of an Irish Wolfhound.—*Gaines Dog Research Center.*



U. S. Army photo

Talking shop are (left to right) Col. William E. Jennings, V.C., deputy camp commander of the Fifth Annual Veterinary Reserve Officer Training Corps Summer Camp held at Brooke Army Medical Center, Fort Sam Houston, Texas; Dr. William A. Hagan, dean of New York State Veterinary College, Cornell University; Dr. T. A. Gage, BAI inspector; Dr. John Langridge, BAI veterinary supervisor; Maj. Bernard H. Skold, V.C., a veterinary instructor at the 1953 Army Veterinary Corps Reserve Officer Training Corps Summer Camp held at Brooke Army Medical Center, Fort Sam Houston, Texas.

Clinical Experiences With Blood, Plasma, And Electrolyte Infusions In Dogs

C. E. BILD, D.V.M., Miami, Florida

THE use of blood, plasma, and electrolyte combination solutions is one of the most fascinating phases of small animal clinical medicine. Uses of these supportive measures vary with each case and disease condition as does their value in effecting recoveries. The overall end results, and speed of recoveries, more than compensate for the effort involved. The following are clinical experiences in my practice with the use of blood, plasma, and electrolyte solutions:

Readers are referred to Blood Transfusion in Dogs and Plasma Transfusion in Dogs, by Dr. C. E. Bild, appearing in VETERINARY MEDICINE for October 1953 (page 413) and November 1953 (page 457), respectively. This is the third and concluding discussion of this series dealing with clinical experience and observations indicating the efficacy of such treatment in dogs and its wide application in surgical, parasitic, and infectious diseases.

Case 1. Pyometra. Boston Terrier, weight 17 lb., age ten years. This animal had undergone cesarean section several times previously and now exhibited a positive hyperplastic endometritis. Hemoglobin was 14 gm. and no transfusion was planned. There were extensive abdominal adhesions. Difficulty was experienced in removing the uterus. Hemorrhage was severe, and the animal went into shock. A 250 cc. bottle of whole blood-ACD mixture[®1] which contains 190 cc. of blood and 60 cc. of the citric acid, citrate, and dextrose combination was given. As soon as surgery was completed, 200 cc. of an electrolyte solution were given intravenously. In this and the following surgical situations the intravenous electrolyte combination used[1,2] consisted of 1,000 cc. of lactated Ringer's solution with 5% dextrose, to which was added 1,000 mg. of ascorbic acid, 20 cc. of 10% calcium gluconate, and 1 solu-B 5X[®2]. Actually, in this and similar instances, it would have been better therapy to have given the electrolyte combination immediately following blood transfusion. The animal ran and played the day following surgery and recovery was uneventful. In situations of blood loss, transfusion is most successful and efficient when it is given during the time of blood loss[1,2].

Case 2. Pyometra. Mixed terrier, weight 20 lb., age eight years. Hemoglobin was 8 gm. or 50%, and blood transfusion was planned to be given during surgery. Nembutal[®1] was the anesthesia used. This patient was given 250 cc. of blood-ACD mixture, sent home six hours after completion of surgery, and treated with antibiotics as an outpatient for three days. Recovery was uneventful.

Case 3. Cesarean Section. Boston Terrier. Two apparently normal puppies were delivered. There followed an extensive and unrelenting hemorrhage from the uterus. This situation has occurred three times in my practice. Pitocin [®3] (0.5 cc.) was given intramuscularly and 7 cc. of 10% calcium gluconate intravenously, in an attempt to contract the uterus. It was inadvisable to remove the uterus as the

[®1]Abbott Laboratories, North Chicago, Ill.
[®2]The Upjohn Company, Kalamazoo, Mich.
[®3]Parke, Davis & Co., Detroit, Mich.

animal was used only for breeding purposes. Since this 13-lb. dog was suffering considerable blood loss, we reasoned that the approximate amount of blood lost should be replaced, and also that the animals could be given an additional 8 cc. of blood per lb. of body weight. This dog was given 250 cc. of blood-ACD mixture. Recovery was uneventful.

Case 4. Abortion. Shepherd female, four years of age. This animal aborted seven puppies 55 days after being bred. When presented, temperature was 105 F. There was hemorrhage from the uterus. High temperature persisted, as did the hemorrhage. A week after the abortion, this animal was subjected to hysterectomy. A total of 1,500 cc. of whole blood-ACD mixture was given during a period of three days. Temperature continued to be high for about a week, after which time recovery was uneventful. When there is delay of days between blood loss and blood replacement, one often finds that animals somehow adjust themselves to a lowered hemoglobin level. This situation requires more unit volumes of blood than was lost to bring hemoglobin content near the former level[2].

Case 5. Cesarean Section. Boston Terrier. This 18-lb. animal was sectioned at the first signs of labor. One large puppy was delivered and surgery was uneventful. We were preparing to send both patient and puppy home when the patient exhibited signs of shock. Mucosa became pale. Hemorrhage from the uterus apparently was slight and not considered a contributing factor. Blood was hurriedly drawn from one of our donors and 150 cc. of blood and 40 cc. ACD mixture transfused. Improvement in the condition of the animal was apparent before half the blood was given. This animal was sent home about an hour after completion of the transfusion.

Case 6. A Pug female in poor condition was sectioned at full term. The only apparent reason for the operation was uterine inertia. Six live puppies were delivered. After the operation, 250 cc. of an electrolyte combination solution were given intravenously. The animal also received 0.5 cc. of pitocin intramuscularly and was discharged immediately following surgery. The following morning the owner returned with the animal. Temperature was 105 F. The uterus was hard and quite large. This patient was given ¼ gr. of morphine in 10 cc. of normal saline intravenously, and 2% novocain[®4] was injected in the midline. The original abdominal incision was opened and a hysterectomy performed. Whole blood-ACD mixture (250 cc.) was transfused and the patient sent home postoperatively. This animal was brought back daily for four days for administration of an antibiotic. Recovery was uneventful. All six puppies survived.

Case 7. Hyperplastic Endometritis. Boxer, female, nine years of age. This animal was presented for examination which disclosed a foul vaginal discharge. The patient was *in extremis.* The owner advised that the dog had not eaten for seven days but that the vaginal discharge had occurred only the morning of our examination. Hemoglobin was 14 gm. and white cell count 110,000. This animal was subjected to surgery with local anesthesia. A total of 20 cc. of 2% procaine was injected in the midline, intraperitoneally, and a small amount into each ovarian ligament. During surgery there was given a total 1,000 cc. of an electrolyte combination solution, 250 cc. of whole blood, and 200 cc. of plasma. No significant amount of blood was lost. Within four hours this patient was drinking water. When the dog was sent home the same evening, the owner was advised to give the animal a mixture of myeladol[®5] and delmor powder[®5] every three hours. Since there is no storage of proteins[4,5] in the body, the early and continuous use of amino acid feeding has virtue in[5] recovery and for hastening healing processes during a period of anorexia and convalescence. This animal did not eat for seven days postoperative. The tension sutures in the abdominal incision were left in place for three weeks because of fear of evisceration. Intravenous fluids were not given except during, and the first morning after, the operation. After seven days of anorexia, recovery was progressive and uneventful.

Case 8. Prepneumonia. Pointer puppy. A fine Pointer puppy was presented at ten weeks of age with temperature 104 F. and labored breathing. Fecal examination revealed many hookworm ova. Hemoglobin was 8 gm. or approximately 50%. The puppy was immediately wormed. It was also given 10 cc. of blood-ACD mixture per lb. of body weight. Antibiotics and distemper serum were given daily for four days. Recovery was uneventful. The combination of hookworms, lowered hemoglobin, and a concurrent case of suspected distemper-pneumonia constitutes a situation of severe stress.

Case 9. Severe Hemorrhage. Chihuahua. We were instructed in college never to take

[®4]Winthrop-Stearns, Inc., New York, N. Y.

[®5]Sharpe & Dohme, Philadelphia, Pa.

many teeth at one time from an old dog, and it has been a good "house rule" to follow. Later, I had reason to formulate another "house rule" and that was to use, if possible, local anesthesia in removing a small number of teeth from old dogs. Some time ago I learned, by a painful process, that it is a good idea to run urea determination on old dogs who are ill and present tooth extraction problems. Since the case here reported, I have made "house rule" no. 4 regarding tooth extraction in the dog that is old or when the mouth and gums appear to be severely infected.

A four-year-old male 2½-lb. animal was presented for examination and teeth extraction just before closing time. Two or three teeth were extracted under local anesthesia, and an antibiotic was given. The owner was instructed to return the dog in 48 hours for further extractions. At about midnight, the owner called and said the animal was bleeding. The teeth extracted were incisors, so I instructed the owner to attempt to stop hemorrhage with pressure and to call me back in 15 minutes. When the client called back I asked how the animal felt to which he replied that the animal was cold and looked like it was dead, and actually had been that way for a long time. I hurriedly met the client at the hospital and fortunately had a bottle of blood-ACD mixture in the refrigerator. The animal's rectal temperature would not register on the thermometer. We exposed the jugular vein with a B.P.-15 knife blade, and started transfusion. Local anesthesia was not necessary, nor was it necessary for anyone to hold the animal. One could hardly perceive respiration. This small dog was given a total of 100 cc. of blood-ACD mixture. An error of omission was made here as I should also have given lactated Ringer's solution subcutaneously. At the end of the transfusion temperature still would not register on the thermometer and respirations were only slightly improved. In this extreme situation, I was afraid of having the owner apply external heat and so advised. However, instructions were given to keep the animal in a wool blanket, and to rub it all over very gently and to turn it frequently. The client stayed up the remainder of the night, and about three or four hours later the patient raised its head. The dog was brought back the next morning with 100 F. temperature, and would take a little water. The site of the original hemorrhage had been closed with catgut suture. At this point, we perhaps should have given this animal 40 cc. of lactated Ringer's solution subcutaneously. Since the patient was beginning to take a little water, no therapy except an antibiotic was given. The owner was advised to feed the dog anything that it would take and as often as possible. Myeladol, about 10 drops four times daily, was prescribed. The first afternoon it was brought back to the hospital and slight hemorrhage was observed. We gave 40 cc. of blood-ACD. A month or more later, the tooth situation was corrected by taking one tooth at a time, early in the morning and with an interval of a few days between extractions. This animal has been well since. Every small animal clinician sees an occasional unbelievable recovery; the above is by far the most remarkable recovery that I have ever witnessed.

Case 11. Obstruction of the Small Intestine. Boxer male. When this animal was presented, the owner said, "He looks like he was poisoned badly and is probably going to die." The animal was extremely lethargic, and had been vomiting continuously. Blood urea was 100 where one would expect it to be 300 in such an animal in the same stage of acute leptospirosis*. A small bone in a large ball of narrow strips of celophane was located in the small intestine. The obstruction was removed surgically but the animal was in shock before surgery and after recovery from anesthesia. Since hemoglobin was too high to register on the hemoglobin meter, we did not wish to administer whole blood to further load the circulatory system. Instead an electrolyte solution combination intravenously was given with 1,600 cc. of plasma during the succeeding 48 hours. Because hot water bottles were used during severe shock the animal was "burned" severely in four places. This condition was not apparent for two weeks. Strange as it may seem, for five weeks, the last of the areas "burned" were only hard and dry. There followed skin deterioration and an open, slow healing sore appeared. The same amount of heat applied to an animal under anesthesia but not in shock would probably not be as harmful.

Case 12. Snake Bite. Pointer female. This animal was brought to the hospital approximately one hour after being "hit." The dog was very weak, and exhibited nystagmus. When placed on the floor, it would walk slowly in a small circle. The animal had been hit on the side of the head which was extensively swollen around the fang marks. Treatment consisted of administration of 600,000 units of crystalline penicillin in normal saline injected around the fang marks and into the

swollen area. Possibly, improvement in the routine would have been to use 5 or 7% dextrose instead of the normal saline as the vehicle here because dextrose is slowly and poorly absorbed[7,8]. It has been said that snake fangs carry many organisms. Since the use of antibiotics, I find little sloughing; in the days before antibiotics, sloughing at the site of fang marks was a feature of rattlesnake bite conditions in those dogs which survived long enough for deterioration to take place.

Circulation appeared poor. This Pointer was given immediately 600 cc. of lactated Ringer's solution and at the same time 250 cc. of whole blood-ACD mixture. Immediately afterward 400 cc. of plasma were given. This was the frozen plasma referred to in the preceding discussion (*Vet. Med.*, 48:457 [Nov.], 1953). At the owner's request, one ampule of antivenom was injected into and around the snake-bite area. Following infusion of blood, plasma, and electrolyte solution the animal and the circulation were improved. Nystagmus and the walking in a circle were less pronounced. No other treatment was given except 600,000 units of aqueous procaine penicillin injected intramuscularly. Four hours later the animal started to drink water. The next morning swelling was extensive, extending from the throat down well between the front legs. Blood-ACD mixture (250 cc.) was given twice the following day to offset loss of blood from the circulatory tree into the snake bite area. Antibiotics were given for four days. The Pointer appeared normal within a week.

Those interested in the problem of snake bite may read Ross Allen's Florida Reptile Institute pamphlet[9], wherein he states that of ten dogs struck by rattlesnakes, three get well without treatment, five with good treatment, and two will not survive under any kind of known treatment. A very fine article on snake bite was sent to me by Dr. J. L. Ruble of Orlando, Florida. The article appeared in 1936 in the *American Rifleman*[10]. It was written by Dr. Dudley Jackson,[11] San Antonio, Texas, and explains why immediate suction should be applied to and around fang marks.

Prior to use of extensive blood transfusion in the dog, and before the availability of antibiotics, I had presented in one day three different Rip Rap Pointer females, all of which had been hit on the head by rattlesnakes. None of the bites were severe and all ate the same day.

Since reporting the above case, it has been learned that there was published in the July 1927 issue of the *Texas State Journal of Medicine*, findings by Dr. Dudley Jackson, Sr., and associates, in a series of experiments which proved conclusively that incision and suction should be applied as first aid, and later during any therapy, around fang marks, and to any swollen area caused by snake bite. Incision and suction were not used on this dog — an error of therapy. The article referred to above should be read by everyone concerned with snake bite problems. It would appear that incision and suction always should be employed and that blood, plasma, and electrolyte solutions may often be used to advantage.

Case 13. Hookworm Anemia. Mixed Cocker Spaniel puppy, weight 4½ lb. Oral mucosa was virtually white and hemoglobin was so low that it would not register on the hemoglobin meter (Spencer). The puppy was given 50 cc. of blood-ACD mixture intravenously and 40 cc. of the lactated Ringer's solution, with a small amount of vitamin B added, subcutaneously. There was a small amount of blood on the thermometer but no hemorrhagic diarrhea. Temperature was 98 F. Tetrachlorethylene (0.5 cc.) was given and two hours later ⅓ of an anthelin®* tablet. Four hours after the original transfusion, the puppy was again given 50 cc. of blood-ACD intravenously, and 40 cc. of lactated Ringer's solution subcutaneously. This puppy was very lethargic, but eight hours later it ate raw beef. The following day the puppy ate well and the oral mucosa was a good red color. As to electrolyte dosage, Rosenthal[12] demonstrated the use of electrolyte solution up to 15% of body weight in 24 hours in experimental shock. In practically every case, electrolyte repair solutions aid blood and/or plasma infusion.

Case 14. Hookworm Anemia and Hemorrhagic Diarrhea. A Boxer puppy, seven weeks of age, presented with severe hemorrhagic diarrhea, appeared to be within hours of death. Its weight was approximately 5 lb., whereas its weight should have been 8 to 9 lb. Hemoglobin level was so low that it would not register of our hemoglobin meter. The animal was given a total of 50 cc. of blood per. lb. of original body weight (5 lb.) during the first 48 hours. Tetrachlorethylene (0.5 cc.) was given and repeated in five minutes and 2½ hours later 1/30 gr. of arecoline hydrobromide was administered. When this patient was presented, we were not using electrolyte solutions subcutaneously in these specific cases as extensively as at present. I am sure that had

*®Jensen-Salsbery Laboratories, Inc., Kansas City, Mo.

we given this puppy 50 cc. of lactate Ringer's solution with a small amount of vitamin B, subcutaneously, twice daily for the first two days, that our original problem of blood transfusions and hookworm disease would have been simpler. It was necessary to reworm this puppy two more times during the first month after the enumerated episode. The animal has remained in good health.

Case 15. Chihuahua. Three-years-old, 5½-lb. dog. This animal was presented at 9 a.m. for treatment of a small laceration over the shoulder resulting from a dog bite. Severe dypnea was present and it was evident that there was extensive separation of one of the intercostal spaces. The patient was anesthetized in the standing position with nembutal diluted in normal saline. The animal became extremely cyanotic. The site of laceration was hurriedly clipped. A spay pack of instruments, previously sterilized, was employed. The animal was intubated, and given positive oxygen pressure and the skin over the intercostal space incised. There had been no hemorrhage into the thoracic cage and the rent extended the entire length of the space. Penicillin (100,000 units) in 2 cc. of saline was injected into the thoracic cavity and the ribs approximated with no. 1 catgut and a routine chest closure effected. As soon as possible after the operation the animal was given 45 cc. of plasma intravenously (frozen product) and 100 cc. of lactated Ringer's solution with 3 cc. of 10% calcium gluconate and a small amount of vitamin B complex subcutaneously. Two and one half hours later the patient was able to get on its feet and stagger around. The animal was discharged at 11:30 a.m. as the owner wanted to stay with the patient. Antibiotics were administered daily for five days. Home treatment included ¼ teaspoon of myeladol and ¼ teaspoon of delmor powder six times daily for about a week. Recovery was uneventful. Temperature never exceeded 101.6 F. I do not believe that as fast a recovery from this traumatic situation could have been affected without the use of the plasma. Over-all success may be attributed in this instance to anesthesia and oxygen use, 60%; surgical technic, 15%; and supportive fluid therapy 25%.

Case 17

Fig. 1. Active patient two days postoperative. Intestinal anastomosis.

In the hospital, where the same animals are used over and over again as blood donors, it is possible that sometimes, in special need, hemoglobin will drop to about 70% (about 11 gm. or less). When 20% of the total blood volume or 8 cc. per lb. of body weight of the recipient is transfused with blood carrying hemoglobin of 70%, then actually one is transfusing only 7/10 of 20% or 14% hemoglobin. The chances are that 15.5 gm. or 100% hemoglobin is more than 30% more efficient than 11 gm. or 70% hemoglobin. Roughly, our 16 gm. hemoglobin animals show a total serum protein of more than 6.5%, while a donor depleted to 70% shows a total serum protein of less than 5%. This is important to remember when making "home made plasma." This is a simplification of a complex problem[5].

Case 16. A 14-week-old Boxer puppy was presented one morning to have its ears retaped and kept during the day. It was given an injection of distemper antiserum and placed in a kennel. Every small animal clinician has seen hundreds of conditions of urticaria and, in my case, this is the only serious one that I ever saw. The entire staff was helping with

an operation. The puppy was found later with extensive urticaria, and was dypsneic and cyanotic. The condition looked too critical to try antihistamines and we were afraid that a lapse of time, waiting to see if the antihistamine would help, might be a final precipitating factor. The animal was given rapidly 250 cc. of plasma. Oxygen was made available to the animal. It appeared advisable to hospitalize for three days because this puppy was quite lethargic; after that time recovery was uneventful. Mercks Manual mentions a similar condition[13].

Case 17. Cocker Spaniel male, 13½ years of age. This dog was in good condition. Hemoglobin was consistently around 15 gm. or 100%. For some months urine analysis revealed one plus albumin. Teeth and hair coat were excellent. The dog was presented for examination because it had been restless for a week and had vomited two or three times. No feedings were refused and bowel movements were normal. Blood counts were normal. A free-moving mass, the size of a golf ball, could be palpated in the abdomen. An exploratory laporatomy was performed and the mass determined to be a growth inside the wall of the small intestine. It was removed and an open anastomosis performed. This Cocker weighed 33 lb. and was given, during and immediately after surgery, 500 cc. of lactated Ringer's solution with 5% dextrose, 10 cc. of 10% calcium gluconate, and 500 mg. of ascorbic acid and one half vial solu-B 5X. Prepared plasma (200 cc. of stored frozen product) was also given. Transfusion was not used because little blood was lost during surgery, and because the hemoglobin level was normal. This patient was ambulatory the following day. Hourly feeding was started the following morning. On the first and second postoperative day, 200 cc. of frozen plasma were given. From the second day on the animal was encouraged to exercise and it would chase other dogs and jump onto a small platform about 20 in. off the ground. On the 5th and 9th postoperative days, 250 cc. of blood-ACD were given. Although appetite and attitude were good, hemoglobin level dropped slightly. Beginning the first day after the operation, myeladol and somagen powder® were given four times daily. A weight loss of 1½ lb. was noted during the convalescence. (Patient pictured in fig. 1.)

I believe that all experienced small animal practitioners will agree that involved surgery in the old dogs resolves itself into a problem that is about 30% technic, 30% anesthesia and oxygen use, and 40% circulatory support. In this case, I do not believe that good recovery would have been possible without the use of blood and plasma. Since their margin of safety in aged animals is quite narrow, it is necessary that they receive circulatory support in the way of repair solutions; *i.e.*, electrolyte combinations, blood, and plasma.

Case 18. Pointer female. This dog was jaundiced. Blood urea was 180. Diagnosis: leptospirosis *L. icterohemorrhagiae*. Blood-ACD mixture (250 cc.) was given twice. Penicillin and streptomycin were administered for four days, then aureomycin orally and intravenously for an additional four days. Diagnosis was confirmed by Dr. Martha Ward of the Communicable Disease Center of Atlanta, Ga., two years after the original infection, and this blood examination revealed only the *L. icterohemorrhagiae* antigenic factor. Doctor Ward explains that usually other reactions are evident in first tests and are probably cross-agglutination factors. When the icterohemorrhagiae factor persists, as it did in this case for two years, it may be considered definitely as the incriminating infective agent. The above case presented other interesting features. The animal apparently returned to normal and has remained in good health. Apparently the kidneys were not severely or permanently damaged. When this dog was ill, the client had two, four-month-old puppies, in the same pen. One of the puppies died. The other puppy did not become ill and has remained in good general health.

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Designs For Small Animal Hospitals

ROBERT W. HECK*, Auburn, Alabama

THE practitioners of small animal medicine are becoming more aware of the necessity for adequate hospital facilities. They are interested in functional and economical interior planning with a pleasing exterior design which will adequately advertise their services to the community.

Increasing calls for architectural services have provided a stimulating problem for the third-year design students in the School of Architecture and the Arts at the Alabama Polytechnic Institute. With the cooperation of the Small Animal Clinic at this institution and the technical assistance of Dr. James E. Greene, Dr. McKenzie Heath, and Dr. Edward M. Jordan, the students have produced three creditable solutions for the practitioners of this area.

The original program emphasized three major considerations: (1) A proper analysis of site and immediate physical environment; (2) a good apportionment of interior and exterior space; and (3) a pleasing exterior expression.

Site

The site selected was in a growing suburb of a large Alabama community. It was anticipated that the area would provide an attractive place for an established veterinarian to open a new hospital and clinic.

The lot size was approximately 66 feet by 115 feet. The property was furnished with electricity, gas, and water. A five-foot, city-maintained sidewalk passed along the front of the property, and a 12-foot, off-street parking strip was provided to accommodate from three to four automobiles. It was considered mandatory that an alley service the rear of the building.

Function

The proper interior spatial requirements were accomplished through three major divisions: administrative, medical, and service.

The administrative area consisted of a small reception lobby with visual and ambulatory control for the receptionist-secretary. Immediately adjacent to the reception area was the medical examination suite and veterinarian's office. The medical suite emphasized convenience and privacy. The veterinarian's office acted as a control point for examination, surgery, laboratory, and drug areas.

The service core assisted the medical unit and relieved the administrative and medical sections from annoying interruptions. The attendant in charge of this area was to assist the veterinarian, prepare animals for treatment, feed ward patients, and supervise all activity within the service area.

It was anticipated that the hospital would handle approximately 30 animals. The wards and runs were planned so as to provide control of noise and odors, and protection from contagious diseases. Emphasis was placed on easily maintained open runs and kennels.

The spatial organization of the hospital was made with the convenience of doctor, receptionist, attendant, and client in mind. The areas were designed for specific activities, but with the thought of smooth integration of circulation. A minimum of walking was provided for each person.

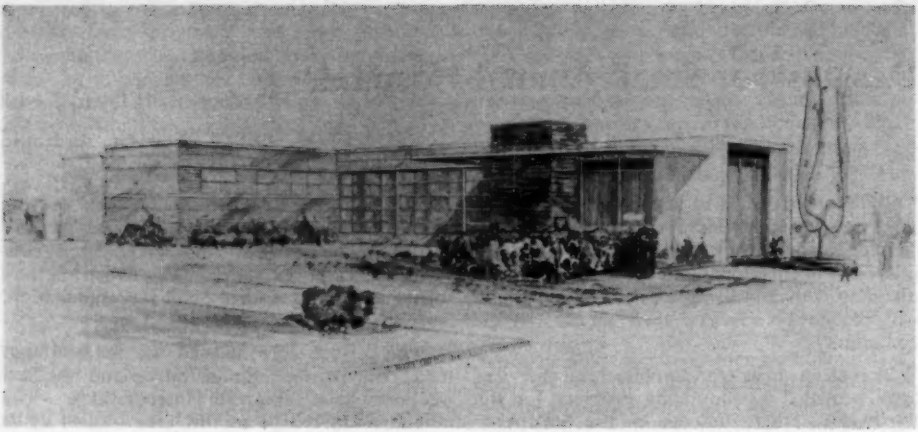
Design

The basic architectural character of the building stressed integration of the existing physical environment with the functional requirements of the plant. A style was not encouraged, but a complete study of suitable materials and forms which would produce an attractive and economical design was emphasized.

Conclusion

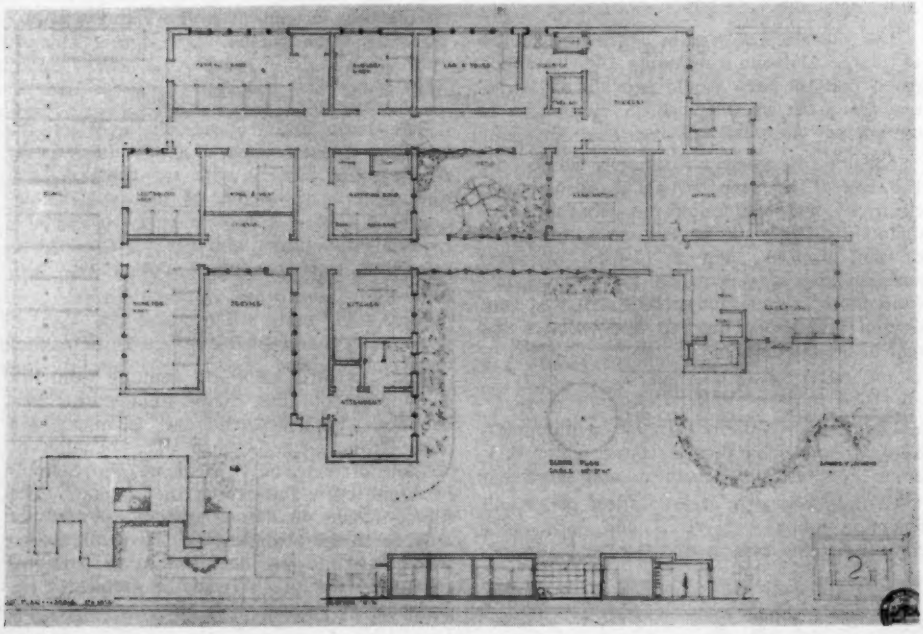
The successful solutions resulting from this study point out that many architectural contributions, both aesthetic and technical, will result from a continuance of association of Schools of Veterinary Medicine and Schools of Architecture throughout the country. The future result of these associations will not only be to the advantage of the young architect going into practice, but to the veterinarian who will profit from the architect's experience.

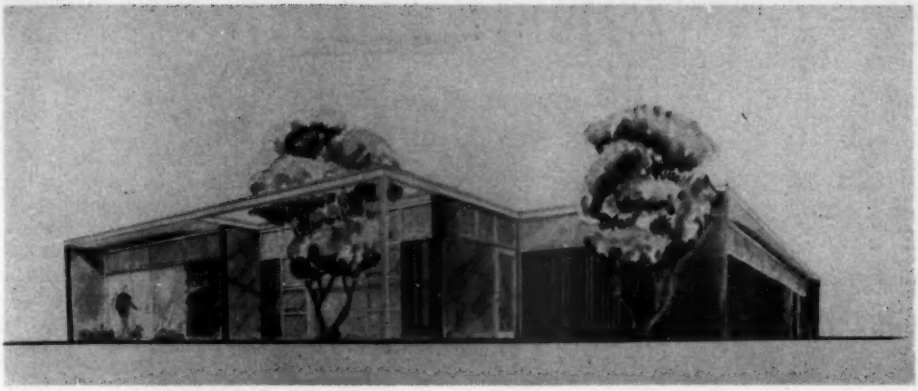
*Assistant Professor of Architecture, Alabama Polytechnic Institute.



Plan 1. A refreshing plan type which includes interior courts for the admission of natural light and ventilation for the examination and grooming areas. The hospital has been zoned with two corridors. The main corridor services the examination, kitchen, and boarder wards, while the second corridor provides privacy for medical and surgical cases.

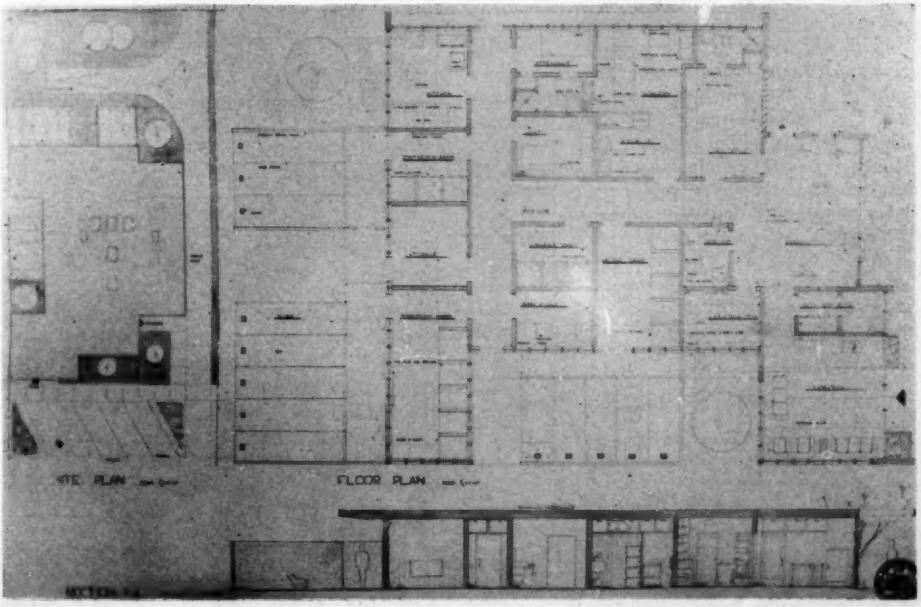
The building has been designed with three basic materials. Common brick has been used for the rear units while stucco and rough field stone produce an attractive focal point for the entrance mass. The interior features painted plaster with ceramic tile wainscot. The floor is of quarry tile. The building would range in cost from $9. to $10. a square foot in the Alabama area.—Auten Lowrey, student designer.

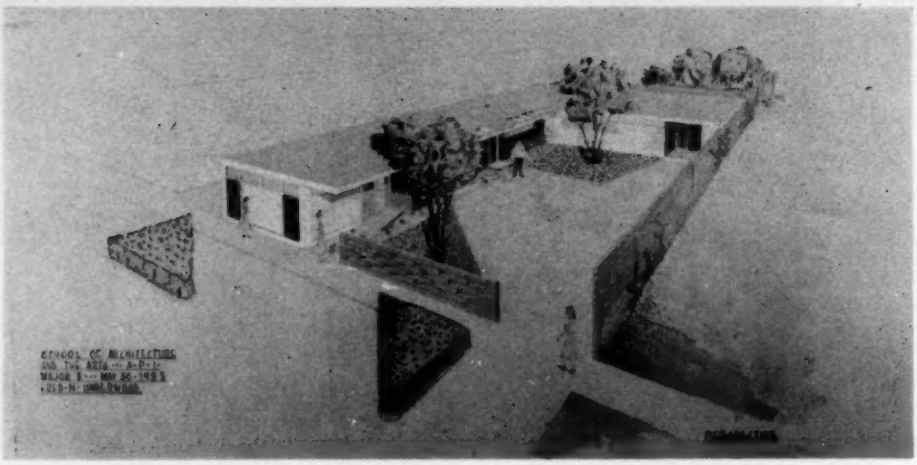




Plan 2. The planning concept utilized in this problem was that of a major traffic corridor which permitted all services to flow without interruption. Through this medium the hospital could be zoned into receiving, treatment, and servicing. A highlight of this particular plan is the ease in which outpatient animals may be received, treated, and discharged through the examination room.

The building is of simple wall bearing construction. The major building materials are brick and redwood. A conventional flat, built-up roof covers the space with the interior finish primarily of tile and hardwall plaster. The building without equipment would cost from $9. to $10. a square foot in the Alabama area.—Leslie M. Kramer, student designer.

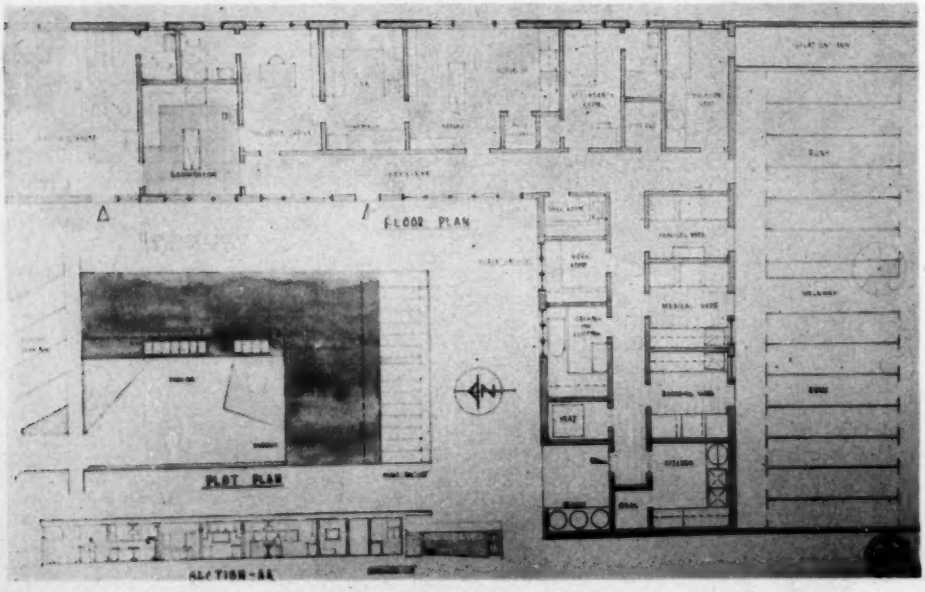




Plan 3. The basic "L" shaped plan utilized the entire site. The interior court provides free circulation to all divisions of the hospital. The reception lobby controls the incoming and outgoing patients with facility. The medical suite has been grouped so as to control excessive walking. The attendant has an easily supervised and convenient working area.

The structure consists of a simple post and beam construction of reinforced concrete. The space is covered by a thin, light-weight, concrete slab roof. The exterior walls are of brick, metal, and wood which add variety to the design. The extreme projection of the roof to the west is to protect the reception area and corridor from the intense western sun. The interior treatment will be primarily of painted plaster and ceramic tile. The building would cost approximately $10. a square foot in the Alabama area.

—Fred Underwood, student designer.



EDITORIAL COMMENTS

Review of Progress in Veterinary Science—1953

Progress in veterinary science during the past calendar year has been marked by significant accomplishments. A brief review offers convincing evidence that veterinary medicine has a brilliant future. In retrospect, advancements in 1953 were highlighted by: (1) Additions to our knowledge of disease control, (2) development of consciousness of the hazards of Old World plagues to susceptible American livestock, (3) development of new therapeutic agents, and (4) progress in understanding of the role of microorganisms in the digestive tracts of animals, especially ruminants.

Experiences with recent outbreaks of vesicular diseases, and others, in this and other countries, have emphasized the need for revision of long standing and outdated disease control procedures. Because a set of methods was successful in effective control of one disease does not mean that the same procedures may be successfully applied to another. It is elementary to point out that the character of different diseases varies. To be effective, control tactics must be worked out to fit situations and be directed toward the weakest point of the enemy front.

Successful disease control depends on cooperation of veterinary practitioners, disease control officials, and stockmen. It means: (1) Prompt detection and reporting of abnormalities of any type and especially those not recognized, (2) accurate diagnosis by exhaustive clinical examination and laboratory means, (3) knowledge of the nature of the condition observed, its contagiousness, and extent, (4) elimination of the responsible agent from the host by treatment and from the environment by sanitary measures, (5) isolation and quarantine of all sick and exposed animals to prevent spread, (6) development of effective prophylactic and therapeutic agents, (7) elimination of the focus of infection in selected instances, (8) and other especially designed methods developed in consideration of the situation.

Legislative action in many states during 1953 and amendments to federal regulations restricting interstate movement of swine fed uncooked garbage and products of their carcasses, are a glowing tribute to those who convinced lawmakers that attack at this point of the transmission chain promises economical disease control. It also offers protection against a number of swine diseases and human disease that may result indirectly from feeding raw garbage to meat hogs. It fits the pattern of effective control of vesicular exanthema.

To our subscribers and their families everywhere,

Greetings for a Joyous Christmas Season and a Happy New Year.

The Editor and Staff of
VETERINARY MEDICINE

Exotic Diseases

Those diseases of animals now classified under the designation "exotic" might conceivably be immediate problems of tomorrow. No one can forecast where or when an outbreak of one of these may occur. It is sensible to recognize that livestock in this country are susceptible; that because of transportation developments, infection can be easily introduced; and that it is impossible to erect an impregnable barrier that will assure absolutely against introduction accidentally or by design. Practitioners have been encouraged to consider these diseases. Educational material has been prepared and some is available. Response has been indifferent for the most part. It is more important today than ever before that veterinarians be acquainted with these diseases, know how to recognize them, and what constitute the best procedures to follow in case of a local outbreak.

Development of Therapeutic Agents

A half-dozen or more new antibiotics that give therapeutic promise have been isolated and studied. Some of them are named, including tetracycline, hygromycin, streptogramin, ruticin, streptocardin, and methymycin. Their potential for the treatment of a wide range of bacterial and viral disease is tremendous. New combinations of well-known anti-

biotics of proved merit have also provided practitioners with more effective tools. Research in this field is being intensively pursued, This work is certain to be fruitful. The past few and succeeding years may represent the antibiotic development era. In spite of premature claims of what might be accomplished and disappointment in some results, there remains the conviction that by judicious use better results might have been accomplished and will be possible in the future with these marvels of chemical and biological research.

Nutrition in Ruminants

Those who have perused current veterinary literature have become conscious of strides made in the understanding of the role of microorganisms in rumen digestion. These studies are of interest, not only because they direct the attention of feeders to the value of roughages for these animals but also because of the vital importance of a proper or normal, favorable flora that will assure health and economical growth and gains.

Hog Cholera Eradication

Two years ago, Alabama outlawed hog cholera virus. It was considered by many authorities a "noble experiment" in eradication of this disease of swine. Now, it is apparent that this first phase of eradication provides a vital safeguard. Tennesse law also prohibiting importation of virulent virus becomes effective on January 1, 1954. These events forecast the possibility of eventually eliminating this scourge of the swine breeding industry.

Education and Economics

During the past decade every school of veterinary medicine in the country received many more applications for admittance than could be accommodated by existing facilities. This situation appears to have been largely overcome and was less of a problem in 1953. In one midwestern school all qualified applicants of the state were accepted. In another, approximately one-half those applying gained admission. A few years ago many times the number accepted annually made application for admittance. What is the reason for this change? Are fewer young men interested in veterinary science? Facilities have been added in six states in recent years which include schools at Georgia, Minnesota, Illinois, Missouri, Oklahoma, and California. The backlog of veterans whose training was interrupted has been relieved. It is rather generally accepted that the training facilities now available are graduating larger numbers than are being lost by retirement and death. If the scope of veterinary medicine continues to increase, as it gives evidence of doing, more young members of the profession will be required to fill the new posts.

Practitioners in many sections of the country have mentioned that gross returns from practice were less during the past year than in recent previous years. This situation is likely to be an adjustment to normal rather than subnormal. This reporter believes that the best defense against reduced demand for veterinary service is in the individual effort of practitioners to improve themselves professionally. This may be done by more careful study of current veterinary literature and new books, attendance at short postgraduate courses offered at veterinary schools, and meetings of veterinary associations. Resulting improvement in diagnostic acumen, acquaintance with new methods and procedures, and perfection of technics will assure against loss of practice and tend to strengthen the position of the veterinarian in his community.

In all, it may be said without fear of contradiction, that veterinary medicine has gained stature in 1953. This has resulted from conscientious, thoughtful service of practitioners. The profession is also receiving increased appreciation by realization among stockmen that no single factor is more important to successful livestock operations than reduction of losses caused by disease and parasites.

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Anthrax Outbreak in England Traced to Contaminated Bone Meal

Further evidence is provided in a recent report in *Lancet* of dangers in the use of unsterilized bone meal. Some 13 human cases of anthrax in Britain are said to be due to contact with sun-dried bone meal imported from the Far East. Reported increase in the incidence of anthrax among farm animals in Great Britain also may be due to use of contaminated bone meal in fertilizers and feeding supplements.

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Frozen Semen

An Italian scientist, Dr. P. Montegozza, in 1866 observed the survival of human spermatozoa after exposure to temperatures of —15 C. He speculated at the time that frozen semen might be used in animal husbandry. Doctors Bunge and Sherman, Iowa University Medical School, report that three women have been successfully impregnated with frozen semen. An English research group found that the addition of glycerol prior to freezing dilutions of semen increased survival of spermatozoa.

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Vaccination of Army Dogs

A newly developed rabies vaccine, which was field tested during the past year by the Army Veterinary Corps, produces with one injection as great a degree of immunity as the three-dose method now required by the Corps. The new product is a living virus vaccine produced in embryonated chicken eggs. Field tests were made at Fort Bliss, El Paso, Tex., and at Fort Sam Houston, San Antonio, Tex.

Canine soldiers, whether infantry scouts, messengers, or sentry aids, will also have protection against infectious canine hepatitis under recently announced authorization by the Army.

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New Treatment for Mastitis

Clinical experience with a new liquid antiseptic, a mercuriated sterol is reported by N. A. Rothenberg[1]. The preparation is claimed to satisfy the need for a treatment that is bactericidal for organisms not susceptible to sulfonamides or antibiotics but for those that have developed resistance to these widely employed agents. The author infers that promiscuous lay use of these last mentioned effective agents is largely responsible for drug fastness and resulting clinical mastitis difficult to resolve.

Included in this report are results following treatment of 52 cases with mastex®, a brand of mercosterol, 49 of which cases responded favorably. The usual dose of 10 cc. of the oil preparation was injected once or twice daily into the mammary gland with a syringe and needle. The active ingredients have a tendency to float on the milk instead of being absorbed, thus attaining and maintaining close contact with infected areas.

[1]Rothenberg, N. A., A New Intramammary Treatment for Mastitis. *N. Am. Vet.*, 34:775 (Nov.), 1953.

[2]Pacific Laboratories, Richmond, Calif.

Bovine Brucellosis Vaccine Causes Infection in Man

Case reports of accidental Brucella infection are reported in the *Journal of the American Medical Association* for November 28, 1953.

Physicians report two cases, one due to splashing into the eyes. Writers make the inaccurate claim that these cases represent the first definite proof that direct contact with the vaccine used to immunize cattle against brucellosis can cause undulant fever in man. (See *Veterinary Medicine*, 46:117 [Mar.], 1951).

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Foot-and-Mouth Disease Remains Confined to Small Area in Mexico

Under the above caption, news release of the USDA advises that infection in Mexico has been confined to an area reaching no further than 30 miles distant from the first confirmed case of the most recent outbreak.

This brief report contains doubtful assurances of increasing cooperation from the livestock owners in the quarantine zone and enforcement of quarantine lines. The problem continues to have emergency status. The first report of infection this year was almost seven months ago. It has been previously indicated that efforts of American officials have been opposed by Mexican political, rather than veterinary, authorities. Unless aggressive action is taken to eradicate infection and control spread of the disease, the Mexican and United States livestock industries will continue to be threatened with irreparable losses.

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McKercher (*Am. Jour. Vet. Res.*, 14:105 [Jan.], 1953), using the original strain of the feline pneumonitis virus, injected kittens intramuscularly. When the disease developed, he divided the kittens into two groups, and administered antibiotics to one group. A variety of agents were used, the dosages based largely on the recommendations of the manufacturers. The authors concluded that aureomycin and terramycin[3][1] were most effective, although the virus was present subsequent to treatment. Chloromycetin®[3][2] and penicillin were of questionable value; streptomycin entirely ineffective.

[3][1]Chas. Pfizer and Co., Brooklyn, N. Y.

[3][2]Parke, Davis & Co., Detroit, Mich.

Vesicular Exanthema Control Committee Formed in California

All segments of California's hog industry were invited to send representatives to an organizing group out of which has developed the statewide Vesicular Exanthema Control Committee. Its purpose is to cooperate with the California Department of Agriculture in regard to this disease of swine and its control and eradication.

This important announcement gives promise of action toward eliminating foci of infection in California now a threat to swine in every section of the country. It is anticipated that this newly organized group will cooperate with federal forces for control measures and that requirements will be promulgated, either by the Department or the Legislature, for cooking garbage prior to feeding hogs. By this procedure, efforts will be directed against the weakest link in the chain of transmission which will give public health assurances and be benificial to the swine industry as a whole.

It is hoped that the new Committee will be in position to overcome obstructionist tactics of selfish interests that have so far prevented positive control action.

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Approximately 31% of 14,000 garbage-feeding establishments are now cooking the material.—*F. J. Mulhern, D.V.M.*

Contest for Senior Veterinary Students Announced

The American Board of Veterinary Public Health is offering a $100. government bond to the senior veterinary student who develops and submits the best thesis on the subject "Veterinary Public Health", as determined by the faculty of his college. The thesis should not exceed 1,500 words.

Best paper from each veterinary college will be submitted to the Governing Council of the American Board of Veterinary Public Health, which will make the final decision as to the national award winner. All theses must be in the hands of Dr. M. D. Baum, secretary-treasurer, 2601 Locust Street, Denver 7, Colorado no later than July 1, 1954. Competition is limited to schools located in the continental United States.

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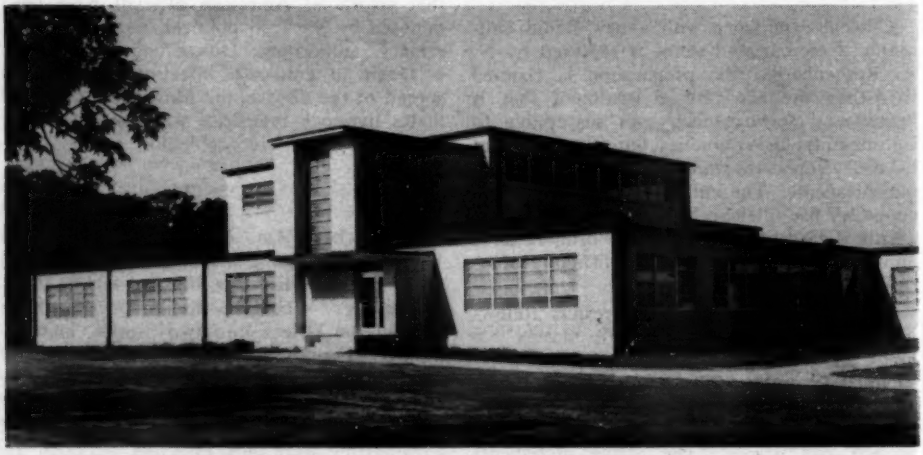
The Mexico-United States Joint Commission for the Control of Foot-and-Mouth Disease plans to erect two meat packing plants in Vera Cruz, Mexico. It is anticipated that by these means it may be possible to remove Mexican objections to the slaughter of susceptible or exposed animals as a method of stamping out the disease. The Commission announced that plans call for expenditure of $1,750,000. to complete the project.



New Veterinary Hospital at Texas A. & M.

The School of Veterinary Medicine at the A. & M. College of Texas will formally dedicate its new veterinary hospital on January 24, 1954. Constructed of brick, concrete, and glazed tile, the new building houses the large and small animal clinics, clinical diagnostic laboratory, two classrooms, and offices for the Department of Veterinary Medicine and Surgery which operates the hospital. Dedication exercises are to begin at 1:30 p.m. on January 24 and will be followed by an open house. All who are interested are cordially invited to attend. Annual meeting of the State Veterinary Medical Association of Texas begins the following day, January 25, in Galveston.

POULTRY PRACTICE PROBLEMS

W. R. HINSHAW, D.V.M., Ph.D.
Frederick, Maryland

Chronic Respiratory Disease (CRD)

Delaplane and Stuart (*Am. Jour. Vet. Res.*, 4:325, 1943) described a chronic respiratory disease of chickens which could be differentiated etiologically from infectious coryza and other respiratory diseases. This disease is now commonly known as CRD, or in broiler producing areas as air sac infection. The causative agent is a pleuropneumonia-like organism. The disease is characterized in chickens by respiratory rales, coughing, and nasal discharge. It must be differentiated from infectious coryza, which is caused by *Hemophilus gallinarum*.

Nelson (*Jour. Exp. Med.*, 63:515, 1936, and 69:199, 1939) was the first to suggest that coccobacillary bodies isolated by him from a coryza of slow onset might belong to the pleuropneumonia group of bacteria. Markham and Wong (*Poultry Sci.*, 31:902, 1952) succeeded in cultivating on artificial media strains of agents from CRD and infectious sinusitis of turkeys that had been grown in chick embryos. They found the agents from the two diseases to be morphologically similar. Subsequent research by numerous investigators has confirmed the findings of Nelson and Markham and Wong.

Accumulated evidence supports earlier work of Delaplane that CRD and infectious sinusitis of turkeys are caused by the same or a similar agent. Reviews on the etiology of these diseases are given by Van Roekel, Olesiuk, and Peck (*Am. Jour. Vet. Res.*, 13:252, 1952); Grumbles, Boney, and Delaplane (*Poultry Sci.*, 31:809, 1952); and Jungherr and Luginbuhl (U. S. Livestock Sanitary Association, Proc. 56th ann. mtg., page 275, 1952).

Extensive fundamental studies are being conducted on all phases of the CRD problem by a number of research laboratories. It is expected that these studies will yield results that will soon aid the poultry industry to solve this highly important economic disease. Improved methods of diagnosis have already been found. Turkey poults serve as an excellent laboratory aid for primary isolation from infected chickens because infected tissues injected into turkey poult sinuses cause a characteristic swelling. Subsequent isolation of a pleuropneumonia-like organism from the infected sinuses, and production of the typical pathological picture in chicken embryos following isolation of the agent, help to confirm a diagnosis.

Antibiotics tested by Gross and Johnson (*Poultry Sci.*, 32:260, 1953) for their ability to prevent death of embryos infected with the CRD and infectious sinusitis agents indicated the following protective effects in the order given: terramycin,[®1] streptomycin, aureomycin,[®2] neomycin, and chloromycetin[®3]. Gross (*Poultry Sci.*, 32:364, 1953) compared streptomycin in water, terramycin in water, and terramycin in mineral oil, as treatments for artificially produced infectious sinusitis. Terramycin in mineral oil was superior to the others and 3.125 mg. of terramycin in oil caused complete recoveries with no relapses. Peterson (*Vet. Med.*, 48:311, 1953) reported success by the injection of 4 cc. of terramycin oil suspension (TMOS)[®1] subcutaneously in the neck of pullets. Field reports from at least one broiler producing area indicate that Peterson's technic for injection of the oil mixture may result in spread and retention of the oil in other parts of the body of broilers, with the result that some birds have to be condemned at time of killing. Van Roekel and Olesiuk (Proc. 25th ann. mtg., N. E. Conf. Lab. Workers, Amherst, Mass., June 16-17, 1953) failed to find any of a number of antibiotics tried to be highly effective as treatment for CRD. Terramycin in oil, as used by them, appeared to be irritating to tissues when inoculated by the subcutaneous route. From the studies on treatment reported to date, it is evident that even though progress has been made, no completely satisfactory drug has yet been found. Nor has a highly successful program for prevention and control been reported.

The facts that the causative agent of CRD has been found, and methods of culturing it have been developed are significant and encouraging. With a definite tool with which to work, we can now expect definite progress in the finding of ways and means to combat this disease. ▼ ▼ ▼

The 10th World's Poultry Congress will be held in Edinburgh, Scotland, August 13-21, 1954.

[®1]Chas. Pfizer & Co., Brooklyn, N. Y.
[®2]Lederle Laboratories Division, Pearl River, N. Y.
[®3]Parke, Davis & Co., Detroit, Mich.

CLINICAL REPORTS

Rabies in a Puppy

L. E. STARR, D.V.M., Atlanta, Georgia

Mr. S., living on a farm near Dahlonega, Georgia, owned one female and several male dogs. The female was whelping under the house during the night of September 8, 1953. A neighbor's dog invaded the premises and fought with this female and then moved on to an adjoining farm where it bit a Chow dog. The attacking dog was shot twice the next morning and disappeared but is thought to have died from gunshot wounds.

The one pup born to the female during the night showed no wounds, neither did the mother. The pup grew without incident until September 27 when it appeared sluggish and stopped feeding. The next day it whined as if in pain and salivated freely, but was not vicious. It died September 29, 1953 and the brain was found positive for rabies by microscopic examination. This animal had evidently received a minor wound at or a few hours after birth and died of rabies when only 20 days old.

Two adults and four children who had handled the pup are taking Pasteur treatment because all had more or less severe scratches and abrasions on their hands, some of which may have been inflicted by the young dog's teeth.

Unless sick, pups are always cute and playful and the urge to handle and cuddle them is irresistible to all children and many adults. Tragically, young dogs, although apparently more susceptible to rabies than adults, are rarely vaccinated. Their teeth are needle-point sharp. If infected, they will bite at the slightest provocation, and the saliva may bear fully virulent rabies virus.

Dogs, particular puppies, are unusually friendly in the early stage of rabies. They are attracted to people and welcome attention but resent handling, even a pat on the head. One such pup invaded a school ground during a play period and another attended a basketball game in Georgia. In each instance over 20 persons, mostly children, were bitten.

Veterinarians are frequently required to examine and treat pups which are not acting quite normal. Owners may examine a pup's mouth with bare fingers or administer a worm pill. Within the next day or two characteristic symptoms of rabies may be noted and then Pasteur treatment is necessary for the exposed person.

This report of rabies in a puppy 20 days of age illustrates the need for extreme caution in handling dogs in a rabies infected area. Surely, eradication of the disease is to be preferred to unenforceable restrictions on children and little dogs.

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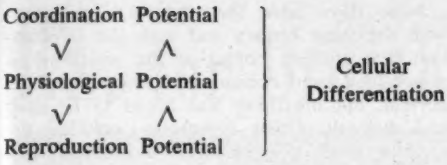
Another Possible Intrinsic Factor in Tumor Genesis

FAHRI HAKIOGLU,* D.V.M., Ph.D.,
and
JAMES R. WADSWORTH,* V.M.D., M.S.,
Burlington, Vermont

During the past decade, many extrinsic agents have been incriminated as etiological factors in the development of tumors. Most of our knowledge is based upon the interpretation of extrinsic, tumor-stimulating processes[1]. Unquestionably, there is less information available relative to intrinsic mechanisms in tumor genesis. According to Haddow,[2] ". . . of the all-important cellular response which yields the tumor, we as yet know next to nothing." To follow is a discussion of a theory relating to the role of intrinsic factors in neoplasia as proposed by Schwartz of Germany.

Embryological development is a highly delicate phenomenon. Each of its complex stages must proceed in an orderly, accurate, and complete fashion. It is thought that every newly-formed cell possesses inherent potentials. A coordination potential is thought to exist, which predetermines cellular arrangements in the architecture of organs. For example, cells destined to form the liver must become arranged in rows of cell cords radiating from the central vein. Perhaps we could call this capacity a histogenetic potential. Likewise, a physiological potential is present in each cell which incites normal cell function. In addition, a reproductive or growth potential is a part of all newly-formed cells, providing a mechanism for growth and regeneration of tissues. Each of these cellular potentials is essentially dependent upon the other and interrelated as shown below.

*Department of Animal Pathology, University of Vermont.



This interdependency requires perfect development of each potential. Collectively, these three potentials provide for cellular differentiation, wherein the specific characteristics of a given cell are determined in the adult body.

Conversely, it may be assumed that a certain cell may lack normal potentials, due to an inability to develop them. Moreover, a cell may lose these inherent capacities for normal structure, function, and reproduction during some phase in its development. Just as human beings differ markedly from each other in biological features, so cells may be likewise dissimilar. Such differences in cellular biology may cause variations in metabolism, thereby producing abnormal potentials. Without these potentials, a cell becomes retrogressive and embryonic in nature. Yet, it remains alive. Oddly enough, such cells all appear similar to each other, irrespective of the structure or organ of which they are a part. It is known that their origin is the same prior to the gastrula stage in embryological development. These deficient cells display distinct discoordination in their subsequent development. Faulty anatomical, physiological, and reproductive processes ensue.

Neoplastic cells are lawless, functionless, and parasitic in nature. They are discoordinated, atypical, and unrestrained. Consequently, it is conceivable that these cells are devoid of one or all of the inherent potentials and become retrogressive. Therefore, epithelioblastomas would consist of such cells, having become neoplastic, derived from the epidermal layer in embryological development. Gliomas and other neoplasms would be comprised of cells from the mesodermal layer, and hemoblastic tumors from the mesenchymal portion of the body. In fact, all connective tissue tumors would result from the mesodermal or mesenchymal layers or both.

From the above, it may be concluded that in every animal body there are undifferentiated cells, which are dormant, yet potentially neoplastic. Tumor development occurs only in those individuals whose intrinsic cellular potentials are abnormal or not present.

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The Use of ECP® for Anal Adenoma in Three Aged Dogs: A Preliminary Report

SHEFFORD S. MILLER, D.V.M.,
Larchmont, New York

This is not intended to be an ultra-scientific discourse, nor is it meant that the reader should draw any definite conclusions as to the value of estradiol cyclopentylpropionate (ECP) in the treatment of anal adenomas of the dog; the number of cases reported is too few and diagnoses have been based on clinical, rather than laboratory, findings. However, the results, to the writer, are interesting and this approach in treating this new growth is somewhat unique.

Anal adenomas have always been a source of consternation in the writer's practice. They are usually found in old male dogs. Inasmuch as these growths are, to some degree, malignant in most cases and because of their location, extirpation is rarely complete and no more than a palliative measure. It is known that many of these tumors are sensitive to *x*-ray.

Case 1. Cocker Spaniel, black, male, 12 years of age, weighing approximately 20 lb. Three anal adenomas extirpated numerous times with subsequent recurrence between March 1949 and March 1953. In the spring of 1952, consultation was advised and the consultant recommended castration. This the owner was reluctant to have performed and, in lieu of castration, a concentrated course of stilbesterol therapy was instituted with no apparent beneficial results. The tumors had become advisedly inoperable by April 21, 1953. ECP therapy was administered with the indicated results, as follows:

April 21—1.5 cc.; May 2, tumors decidedly receded and less vascular—1 cc.; May 9, tumors almost non-apparent—0.75 cc.; May 23, tumors not apparent—0.5 cc.; August 11, slight suspicion of recurrence—0.5 cc. This dog "attracted" other males after treatment was begun and did so until approximately August 1st. No report available as to this phenomenon since the last treatment.

Case 2. Mongrel, black, male, 16 years of age, weight approximately 25 lb. One anal adenoma extirpated on following dates with subsequent recurrence: October 18, 1952, and

®The Upjohn Company, Kalamazoo, Mich.

January 17, 1953. ECP therapy was administered with the indicated results as follows:

April 25, 1953—1.5 cc.; May 30, tumor not apparent—0.5 cc.; August 12, owner reports no evidence of recurrence.

Case 3. Scottish Terrier, black, male, weight approximately 30 lb. (extremely obese). This dog had multiple coalescing tumors completely involving the anus. This dog was primarily a cardiac patient. ECP therapy and results were as follows:

June 20, 1953—1.5 cc.; June 27, tumors had receded approximately a third and become less vascular—0.75 cc. In the middle of July this dog died at another veterinary hospital from causes which were probably not attributable to either the tumors or the ECP therapy. The owner has since reported to the writer that, at the time the dog became acutely ill, tumors had completely disappeared. However, conversation with the attending veterinarian revealed that, in his opinion, the tumors, although slightly apparent, were not "completely disappeared."

Discussion

All ECP (2 mg. per cc. estradiol cyclopentylpropionate) was administered by the intramuscular route. The writer regrets that he has not been able to have had more cases upon which to report. It would seem that these particular new growths have sex significance and that ECP might have some value as a therapeutic agent. The writer would be interested in hearing of the experience of others using this drug in a similar manner.

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Warfarin Poisoning

RICHARD J. BOGUE, D.V.M., Wichita, Kansas

A dog was presented with a history of throat irritation. Temperature was normal. It was learned, on questioning the owner, that this animal had eaten some of Dr. Hess's warfarat, a rat poisoning which contains warfarin. This product produces a prothrombinopenia and causes internal bleeding in rats and in other warm blooded animals if the dose is large enough or if given repeated small doses. The owner had put out approximately 1 lb. of the warfarin poison, and the dog had eaten it all.

The dog was transfused with 500 cc. of whole blood intravenously. Vitamin K (15 mg. t.i.d.) was also prescribed and the patient discharged.

Nine days later this dog was presented with the same history and with the information that another pound of the warfarin rat poison had been consumed. Temperature was normal, but breathing was noted to be deep and difficult. Other symptoms included depression and eye changes associated with hemorrhage. Blood coagulation was determined by the capillary method; clotting time was 13 minutes. Normal clotting time for dog's blood is two and a half minutes. Total blood count revealed 5,400,000 r.b.c., 21,000 w.b.c., 13.2 gm. hemoglobin. The laboratory diagnosis sheet noted many polychromic macrocytes.

Treatment consisted of 500 cc. of whole blood intravenously with 15 mg. of vitamin K three times daily, and 150 cc. saline-dextrose combination subcutaneously.

The following day the patient exhibited quite a bit of pain and dyspnea, plus dryness of tongue and mucous membranes of the mouth. Considerable dehydration developed. A dark, reddish brown diarrhea was noticed indicating hemorrhage into the digestive tract. Temperature was slightly subnormal. Vitamin K was continued with saline-dextrose solutions subcutaneously.

Four hours later a shallowness of breathing developed and the animal died in the afternoon of the second day of hospitalization. Autopsy revealed internal hemorrhage around the pericardial sac and into the abdominal cavity.

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What the Agricultural Press Is Telling Your Clients About Hog Cholera

A warning that a hog cholera threat is building up because of the high percentage of susceptible swine on farms, appears in a recent issue of *Country Gentlemen*. This opinion has been expressed by a number of observers familiar with the swine industry and reported to readers of this journal. Farmers are being told that the new hog cholera vaccines complicate rather than simplify recommendations for immunization of specific groups and that it is more important than ever that growers seek professional advice for proper vaccination methods under specific circumstances.

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BOOK REVIEWS

Books reviewed in this department and any other books, if available, may be obtained by remitting the published price to the Book Department, Veterinary Medicine, Suite 803 Livestock Exchange Building, Kansas City 2, Missouri.

ADVANCES IN VETERINARY SCIENCE, Volume I. A text and reference by 21 contributors, edited by *C. A. Brandly,* D.V.M., M.S., University of Wisconsin, Madison, and *E. L. Jungherr,* D.V.M., University of Connecticut, Storrs. 431 pages; figures; tables. Academic Press, Inc., Publishers, New York, N. Y., 1953. —Price $9.

This book serves as volume I of a series that plans to review progress in the more active fields of research pertinent to veterinary science and application of the knowledge to the art and practice of veterinary medicine and veterinary public health.

The various sections are written by authorities in respective fields. These are: Animal Diseases and Human Welfare, *K. F., Meyer;* Virus Disease, *J. A. Baker* and *C. J. York;* Sulfonamides, *D. K., Detweiler* and *S. F. Scheidy;* Antibiotics, *D. K. Detweiler* and *S. F. Scheidy;* The Infertility Problem of Cattle, *D. E. Bartlett* and *W. L. Boyd;* Bovine Mastitis, *W. N. Plastridge;* Swine Diseases, *S. H. McNutt;* Veterinary Public Health, *J. H. Steele.*

Extensive references and an efficient index comprise features that enhance the highly informative and readable subject matter.

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THE GREAT DANE, by *Virginia Keckler.* 176 pages, 192 illustrations. Judy Publishing Co., Chicago, publishers, 1953.—Price $3.50.

This book is a second and greatly revised edition that discusses history, breeding, care, training, and exhibiting of the Great Dane.

Portions concerned with matter veterinary show an ethical spirit. They hastily recommend veterinary services and present no panaceas.

"Don't delay too long to call the doctor", writes the author, and humorously adds, "both dog and veterinarian want to live." There are a dozen dog care do's and don'ts, a section on "Your Dog and the Veterinarian", and a chapter on "Diseases of the Dog."

The general impact is approximately that of breed books in general insofar as style and terminology are concerned. Its outstanding feature is the deft Judy touch throughout—the numerous photographs, diagrams, cartoons, poems, and odes.

GENERAL BIOCHEMISTRY, a text by *Joseph S. Fruton,* B.A., Ph.D., professor of biochemistry, Yale University; and *Sofia Simmonds,* B.A., Ph.D., assistant professor of biochemistry and microbiology, Yale University. 940 pages, numerous chemical formulae, diagrams, charts. John Wiley and Sons, Inc., New York, publishers, 1953.—Price $10.

This book is divided into seven parts: (1) Proteins, (2) enzymes, (3) biological oxidation, (4) intermediate metabolism of carbohydrates, (5) lipids, and (6) nitrogen compounds, and (7) general aspects of metabolism. The book is a complex biochemical work for advanced students only, not suited for general or cursory perusal. Nearly every page contains organic chemical formulae, tables, charts, or diagrams.

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BLACK'S VETERINARY DICTIONARY by *William C. Miller,* director of the Equine Research Station, Newmarket, England, formerly Courtauld professor of animal industry, Royal Veterinary College, London, and *Geoffrey P. West,* M.R.C.-V.S. 1120 pages, 326 illustrations and 16 plates. 3rd ed. Williams & Wilkins Co., Baltimore, publishers.—Price $9.

The title of this book is misleading. It describes and explains terms, giving root in some instances, but is not a pronouncing guide. Material is organized in the style of an encyclopedia.

The original text produced in Great Britain was modeled on the general design of a medical dictionary with the objective of assembling in a single book brief technical information gleaned from many veterinary works. It is rather simply written in an obvious attempt to satisfy the needs of stockmen in England. It is not, however, one of those too numerous popular works of limited scope intended merely to encourage domestic treatment of the ailments of livestock. Surgical diseases are mentioned briefly but no operative technics are given.

The book is particularly suited for those herdsmen anxious to improve their acquaintance with things medical, to recognize symptoms of common diseases, and to become apt in applying intelligent first aid.